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ANNUAL FWP DROUGHT SUMMARY

2002

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Prepared for:

Governor's Drought Advisory Committee

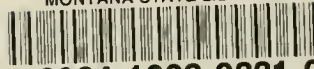
Submitted by:

Montana Fish, Wildlife & Parks

January 2003

(available on-line at <http://nris.state.mt.us/drought/Agencies/StateAgencies.html> or
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I. INTRODUCTION

This Report is provided in fulfillment of the annual reporting requirement of the 1995 Montana Drought Response Plan. The specifics of the annual reporting requirement can be found in Chapter IV (Drought Monitoring) of the Plan, on page 12. The entire Plan is available on the World Wide Web at <http://nris.state.mt.us/wis/swsi/MTDroughtPlan.html>. The section of the Plan relevant to the annual reporting requirement is reproduced below:

Annual Report

An annual report summarizing the year's drought activities will be prepared. This report will include the annual summary submitted by each participating state agency. Agency reports will include assessment and response activities taken by that agency over the preceding months, a list of drought management objectives for the year, actions taken to mitigate drought impacts, and a summary of the problems encountered and successes realized by the agency.

DNRC staff will combine state agency summaries with federal agency reports into a final report of (Governor's Drought Advisory Committee) activities for the year. This report will be used to review and evaluate agency responses, draft suggestions for legislative initiatives, and amend the state drought plan as needed. The final report will be used to plan agency response during future droughts. Recommendations for improving agency response will be presented and discussed at the October DAC meeting. (Montana Drought Response Plan, 1995, p.12)

This report is the fulfillment of FWP's responsibilities under the above Plan requirement to provide FWP's "participating agency" annual report to the Committee for 2001. The remainder of the report is organized as follows, based on the elements of the reporting requirements from the Plan and the apparent intent that these reports be used to improve drought "response" in Montana:

Section II (and Appendix A) – a summary of FWP's drought assessment and response activities, both those that are ongoing, and those necessitated as drought conditions changed over the year;
Section III – FWP's drought management objectives from the Plan, and those informal objectives that arose from conditions in 2002;

Section IV – actions taken to "mitigate" drought impacts, including long-term agency actions, as well as those undertaken as drought conditions changed over the year;

Section V – successes and challenges in FWP's drought response, from our perspective; and

Section VI – suggestions, based on our experience from 2002.

Appendix A is a compilation of FWP's monthly and weekly drought updates to the Committee (and other interested parties) from 2002.

Appendix B – is FWP's chronological compilation of relevant drought headlines from newspapers across the state, as selected and forwarded from the Fisheries Division clipping service.

Appendix C contains FWP's Drought-Related Fishing Closure Policy from 2002, an example of FWP's attempts to balance scientific management of Montana's fisheries, provision of recreation opportunities, and promotion of self-regulation of fishing to preserve the resource.

Appendix D is a compilation of biologist conclusions regarding observed drought impacts on Montana fisheries. (Note that many impacts are not evidenced until several years after low-flow periods.)

As background, the Montana Drought Response Plan defines “drought” as:

... an extended period of below normal precipitation which causes damage to crops and other ground cover; diminishes natural stream flow; depletes soil and subsoil moisture; and because of these effects, causes social, environmental, and economic impacts to Montana. (ibid, p.1)

We at FWP feel that the only way to manage Montana’s susceptibility to the above-described effects is a combination of effective long-term habitat (including streamflow) protection and enhancement efforts, complemented by effective and locally-tailored emergency response strategies and actions. Many aspects of this Report and our activities embody this conclusion.

We do not intend in this report to repeat any of the specific climatic data and reporting presented to the Committee in 2002. That information continues to be available on the Committee’s website at <http://nr.is.state.mt.us/drought/data.html>. This Report will focus on FWP’s specific responses to these reported (and other) conditions, our evaluation of those responses, and suggestions for improvement.

As a final note, this is the third year-end drought report in a lengthy drought cycle. References provided in previous drought reports, and that may be useful to readers, are not repeated here. FWP’s Annual Drought Summary for 2001 is posted online at <http://nr.is.state.mt.us/drought2001/reports/FWPDroughtsum01.pdf>; the 2000 Summary is at <http://nr.is.state.mt.us/drought2001/reports/DACFWP2000summ.html>. These reports contain appendix information that may be valuable to others experiencing interested in drought response, but that would make the 2002 Summary overly voluminous if included.

II. FWP DROUGHT ASSESSMENT AND RESPONSE ACTIVITIES

We feel the best way to describe FWP’s drought response during 2002 is to divide it into: (1) ongoing activities (i.e., relevant activities we do on a regular basis, whether drought conditions exist or not), and (2) emergency response under drought conditions. These types of assessment and response activities are described below for 2002.

Regular and Ongoing Assessment and Response Activities

There are many activities that FWP administrators and field staff conduct to regularly assess the relationships between climatic/hydrologic conditions and habitat, whether such conditions are overly dry, overly wet, or near normal. These include:

- Checking snowpack and precipitation reports and forecasts to help determine what the needs and issues of the upcoming seasons will be, both for Montana’s fish, wildlife and recreational resources, as well as to the local communities and businesses associated with those resources.
- Tracking streamflow and water temperature conditions in Montana’s priority streams and tributaries to determine relative conditions for fish and wildlife, and recreational activities, dependent on certain flow minimums, maximums, pulses, or timing.
- Observing in the field and noting anecdotal information regarding actual species’ (including

human!) response to changing moisture conditions; e.g., location of bull trout relative to flows and/or water temperatures in a stream, reported groundwater conditions (e.g., flows from springs and wells), comments from canoeists of Smith River conditions, or movement of deer and elk into or away from irrigated pastures.

- Communicating within divisions, with local communities, and with businesses to respond appropriately to impacts of unusual moisture conditions in a consistent and science-based manner.
- Participating in ongoing policy, planning, and informational efforts related to how the fish, wildlife, and recreational resources of Montana – and the habitats critical to these resources – are perceived, managed, and allocated, both now and in the future.
- Increasing our scientific understanding of the relationships between fish, wildlife, and recreation resources and climatic conditions, and working to make that information available and usable to decision-makers at various levels. Examples include: field determination of appropriate instream flows for various fish species, participating in development of water quality restoration or drought management plans at the local level, sponsoring research into specific factors (e.g., whirling disease) affecting species capability to withstand climate-related stresses, etc.
- Funding (through grant programs or direct expenditures) and conducting specific long-term projects to increase Montana's capability to sustain dry climatic conditions while also maintaining habitat quality, resource productivity, and management flexibility. Examples include: stream restoration grants, streamflow restoration through instream flow leasing, conservation easements to meet habitat and landowner objectives, native species conservation and restoration, coordination with DNRC on water allocation policy and issues, etc.

Specific Fisheries Assessment and Response Activities in 2002

As noted in the Introduction, under dry conditions, and with limited resources, FWP's efforts in long-term drought susceptibility reduction shift to a more short-term (i.e., emergency) response mode, based on the severity of the situation and the needs it creates. Some responses can be planned; others have to be invented in the heat (literally) of the moment. A running summary of our specific response activities for year 2002 is provided in Appendix A, which provides a copy of each of FWP's drought updates that were presented to the Committee, FWP Commission, FWP staff, and posted for public viewing on the Committee's website.

III. FWP DROUGHT MANAGEMENT OBJECTIVES, 2002

The Montana Drought Response Plan (1995) includes the following objectives for FWP drought response in general:

1. Protect FWP's existing instream rights.
2. Supplement streamflows through purchase of stored water, leasing of consumptive rights, and other innovative methods.
3. Obtain reservoir operations which minimize impacts to fish, wildlife and recreation.
4. Monitor streamflow, fish populations and fishing use and harvest to ensure carry-over of wild stream fisheries while maintaining reasonable opportunity for harvest in all streams and lakes. Implement emergency regulations on streams and lakes as needed.
5. Develop and implement an Information and Education Program which informs the public and maintains consistency in the Department's programs.

6. Coordinate an updated Department Drought Summary for presentation to the Governor's Drought Advisory Committee and/or Disaster Advisory Council and the Fish, Wildlife and Parks Commission as required.
7. Develop and implement water conservation practices within the agency.

FWP feels we are continually working toward achieving these objectives, both in the short and long term, though several are difficult to attain under existing water allocation patterns and increasing competition for and allocation of water in certain areas.

Some limitations exist in achieving these objectives. For example, regarding Objective 1, FWP can only protect our instream rights to a certain point. We can issue a call for our senior water, but due to staffing constraints and the reality of water allocation, we can often not determine whether junior water users are heeding the call. Nor can we (with current resources) determine flows on streams that are ungauged. Regarding Objective 4, there are limitations to using only monitoring to "ensure" carry over of wild stream fisheries.

In addition to the above standard objectives from the Plan, FWP's Fisheries Division had some informal objectives that guided us through the drought of 2002, including:

- a. Be proactive where possible
- b. Minimize damage with what few tools we have; develop new tools where possible
- c. Consider risks to potential long-term gains
- d. Be consistent and science-based
- e. Learn from this
- f. Enhance public understanding of issues and long-term opportunities

IV. FWP ACTIONS TAKEN TO MITIGATE DROUGHT IMPACTS

This topic overlaps the assessment and response topic above, but we will reiterate, in list form, the actions we feel help the most in "mitigating" drought impacts.

It should be noted that under existing law and water administration patterns, there is a fairly significant limit to the ability to mitigate impacts of low flows on Montana's fisheries. Despite the below-listed actions, many of Montana's wild cold-water fisheries have been impacted by the flow conditions of 2002 (Appendix D). The extent of these impacts will be determined over time, as additional fish population information is gathered in future years. We suggest that our response to this topic be interpreted as "actions taken to reduce drought impacts" on Montana's fish, wildlife, and recreational resources.

- Working with water users, communities, and other agencies to implement long-term flow and habitat protection and enhancement projects (e.g., instream flow leasing) that reduce drought susceptibility in priority fishery areas (statewide)
- Distributing information to field offices, CDs, and upon request on how irrigators can close irrigation ditches in a manner that encourages entrained fish to move out of ditches into streams, rather than perishing in the canal
- Where appropriate, advocating for voluntary reductions in water diversions from priority streams;

providing information when requested on flow needs of fisheries

- Working with local communities to develop and implement emergency low flow/drought response plans (Big Hole, Jefferson, and Blackfoot). FWP staff are active members of the drought response committee efforts, coordinating with DNRC staff in their measurement of flows, monitoring fishery condition and water temperature, informing committees of problem areas, and generally encouraging collaborative and effective water conservation to address current and projected problem areas. The Blackfoot Drought Plan incorporates a creative alternative to FWP's traditional call for senior water, whereby senior water users contributed conserved water to conceptual "water bank", which juniors that are valid Plan participants can draw against in emergency conditions if certain conditions are met.
- Obtaining instream flow increases by "calling" for water from users junior to FWP's instream rights. FWP has instream flow reservations and/or instream water rights in the Yellowstone, Missouri, and Little Missouri basins (reservations), and "Murphy" (after the legislator creating the instream claim authority) on segments of the Big Spring and Rock creeks, Blackfoot, Flathead (and its middle, north and south forks), Gallatin, Madison, Missouri, Smith, and Yellowstone rivers. In some locations, water reservations and other instream claims overlap.

In 2002, a total of 500 junior water user warning letters were sent to holders of water permits/claims within (and in a few cases, beyond) reaches where FWP holds instream flow reservations or rights. FWP's Murphy right was also referenced in a letter to a selection of junior users in the entire Blackfoot basin, as an incentive to conserve water and participate in the local Drought Committee's voluntary Drought Response Plan. Calls for FWP's senior water were evaluated in the Smith, Tobacco, Big Hole, Sun, Tongue, Yellowstone, Red Rock rivers and Young and Big Spring creeks. Call for FWP's senior water, however, was only made in the Smith (to 7 junior users). A potential call in the Blackfoot was replaced by implementation of the local Drought Response Plan, which includes a provision that FWP will consider the recommendations of the local Drought Response Committee when considering making a call. The Committee recommended a call not be made, despite flows somewhat below FWP's rights. FWP heeded that recommendation.

- Closing waters to fishing where such fishing could put already-stressed fisheries into lethal stress levels or where resource management may create safety hazards to the fishing public. In 2002, voluntary fishing restrictions or mandatory closures occurred per FWP's Drought Closure Policy (initiated in 2000, formalized in 2001, revised in 2002; see Appendix C). Non-voluntary drought-related restrictions were implemented on Bynum (winter closure due to unsafe ice conditions due to aeration project), Red Rock and Beaverhead Rivers and Clark Canyon reservoir (bag limit reductions), upper reach of Big Hole (North Fork upstream to Rock Creek closed to all angling per Drought Plan), Red Rock and Beaverhead rivers (fall spawning-related closure to all angling).
- Providing drought updates, fishery condition information, and related angling restrictions to interested parties via the Internet and dissemination of regular FWP drought updates, prepared through the year (see Appendix A).
- Bringing purchased water down from reservoirs, with assistance from water commissioner (Bitterroot). DNRC delivers the in-stream fisheries flow contract water. The flows vary as needed, with adjustments called for by the Bitterroot water commissioner and FWP local fisheries biologist, based upon flow and fishery conditions at Bell Crossing.
- Through information management, redirecting fishing use from impacted areas to others, to both reduce impacts on stressed fisheries, and reduce impacts to the fishing public from reductions in opportunities.
- Initiated a special drought-related Future Fisheries funding cycle to specifically fund water enhancement projects.

- FWP improved its water rights database to allow instantaneous gauge data to be compared to applicable water right levels for an immediate statewide picture of the status of streamflows in relation to FWP instream rights and reservations. Database issues exist, however, and it will require additional time to fully upgrade.
- The three individual drought plans, two of which were new in 2000, were again successfully implemented and refined in 2002 (Big Hole, Jefferson and Blackfoot).
- Compiled information on known and suspected impacts of drought on specific fisheries, as reported by FWP fisheries field staff (Appendix D).

V. SUCCESSES AND CHALLENGES

The following is an abbreviated list of successes and challenges noted by FWP staff, primarily in the Fisheries Division. Many successes and challenges from previous years continued into 2002, so the reader is again referred to previous year-end FWP drought reports for additional information.

Successes

- Due to previous experience in drought assessment and response, the approaches invented in 1999, 2000, and 2001 were refined and applied again in 2002. Although unfortunate to experience so many low-flow years, back-to-back, one advantage is the smoothness and regularity brought by "practice." (We look forward to getting out of practice with drought response as soon as possible, however.)
- Also likely due to the years of drought experience, FWP staff in 2002 were able to more broadly assign centralized responsibilities for drought preparedness and response. This meant less severe impact on the Water Resources Program, as other FWP staff handled procedures for closures and public information.
- The availability and delivery of Painted Rocks water down the Bitterroot was once again critical to this important fishery surviving drought conditions.
- NRIS and FWP GIS staff assisted in further automating FWP's water rights information. Although placed on the Web in 2000, improvements allowed instantaneous gauge data to be compared to applicable water right levels for an immediate statewide picture of the status of streamflows in relation to FWP instream rights and reservations. The system is not perfect, and the data is still quite rough, but with additional investment and refinement, FWP will be able to improve our communication with our junior water users.
- The three individual drought plans, two of which were new in 2000, were again successfully implemented in 2002 (Big Hole, Jefferson and Blackfoot).
- The Committee website continued as a success in 2002. As in the two preceding drought years, the Internet proved to be an invaluable and easily updateable communication tool.
- FWP assisted in funding ditch sealing along 22 miles of 2 major ditches that carry Jefferson River water. The project was considered a success for both the water users (many who received water more reliably) and the River (because less had to be diverted).
- Due to the existence of FWP documentation (through Committee Updates and previous year-end summaries) of Montana's drought experience and response tools and policies, FWP's Water

Resource Program was able to provide information to representatives of Colorado when they called with assignments from their Governor for drought response suggestions within the week. Though difficult to watch another state go through similar conditions and issues as Montana has experienced over the last three years (at least), Montana successfully shared experiences with Colorado, and continues to provide leadership in drought response at the national level. I'm sure we would all gladly give up the conditions that have created the need for this leadership, but it speaks well for the Committee, the Plan, and Committee member coordination with others that we can serve as a resource so that others may not have to suffer the extent of struggle we have, and that we can learn from other states as well.

- The aeration project at Bynum Reservoir near Valier, funded in part through the Governor's Environmental Contingency Account, was likely a major factor in the survival of this popular fishery when winter depths were no more than 6 feet. Usually 12 feet of depth is a minimum for a fishery to survive the reduced oxygen conditions that occur in ponds and lakes in winter.
- The regular drought conference calls with Fisheries Division administrators and staff, initiated in 2000, continued to be a successful way to communicate and coordinate drought assessment and response activities and related public information.
- As in 2000 and 2001, FWP field staff greatly appreciated the flow measurement and analysis assistance provided by DNRC field staff.
- Internally at FWP, we felt we had another successful year in our relationship with our Commission in the delegation of drought-related fishing closure authority. The trust they have for the Department staff and local Commissioner to make those decisions in the "heat of the moment" made for a relatively smooth response in multiple crisis conditions.
- Although odd to call a success, in a way, the drought likely indirectly caused solution to a 20+-year problem on the Yellowstone with a subdivision with an inadequate water supply. Their continued problems, plus the added difficulty of being a junior user to FWP, encouraged the community to (as has been suggested for many years) sign on for future City water. Although this does not benefit the stream, as they will still be diverting water, it does remove a compliance problem, as they had extreme difficulty in adhering to the prior appropriation doctrine of Montana water law.
- Drought-related media coverage appeared has also been benefiting from experience. Articles are in-depth, explore complicated water-related issues, and drought conditions are more regularly included on local news broadcasts.
- The use of water commissioners in some areas seemed to greatly increase the efficiency of water deliveries, in some places benefiting stream flows as well.
- We appreciate the challenges and difficulties reservoir operators have in balancing demands in low-flow conditions (especially in consecutive low-flow years), and appreciate the communication and support of fishery needs that these people and facilities provide.
- The Future Fisheries Improvement program's emergency streamflow-related funding cycle funded the lining of two lengthy (and leaky) canals that carry water from the Jefferson River. Another project funded in the special drought response cycle was an water delivery enhancement project on Trail Creek in the Clearwater drainage, which will save at least 2 cfs in an important bull trout stream.
- A list of successes must include the helpful information FWP staff obtain from NRCS, USGS, NWS, and others that help us predict and track climate and streamflow conditions. These are critical and valued resources that significantly aid in our limited ability to manage fisheries resources and warn the recreation community of potential resource and safety conditions later in the season.

- Several entities took advantage of near-record (or record) low conditions in lakes and reservoirs (e.g., Beaver Creek Reservoir, Yellowtail Reservoir) to extend boat ramps, which will likely be of benefit in future low flow years.
- Though less success, and more luck, the so-called "Perfect Storm" in early June was a life-saver for north central Montana (though it created some problems for cattle, communications, power delivery, and antelope and bighorn sheep young survival).
- Flows in the upper Marias system were so good this year that Tiber reservoir operators (BuRec) were able to release flows adequate for recreational boating, along with pulse flow that likely benefited late-season-spawning warm- and cool-water fish species in the Marias and Missouri Rivers.
- Consecutive low-flow years have also likely benefited the recent attempts to implement some of the first Water Court decrees on a test basis (Gallatin and Musselshell), but maintaining the incentive for more formal administration in these areas. Water users, commissioners, and the Court are all likely learning from this, and refining the approach based on these experiences. These will create the models, then, for eventual broad implementation of long-awaited Water Court decrees.

Challenges

- FWP staff are frequently asked during periods of low flow to help mediate polarized groups. We will help where we can, where solutions may help priority fisheries, but the demand for this greatly outstrips our ability to assist. Historically, and into the future, there have been and will continue to be water disputes, but this aspect certainly qualifies as "challenging". There is a misconception that FWP has some authority over low flows in the western portion of the state where we do not have many instream water rights.
- FWP's instream flow leases on Mill Creek failed to provide much in the way of fisheries benefits, despite more diligent water administration than in 2001. These leases may not be renewed upon their expiration.
- We continue to receive phone calls from citizens who are incredulous that streams in Montana can legally be dewatered.
- Drought is a time of sacrifice for many. The three watershed drought plans (Big Hole, Jefferson, and Blackfoot) are all built on a concept of "shared sacrifice". We understand that in 2002 there was an egregious lack of shared sacrifice in the Beaverhead River system. Some had plenty of water, others half the amount, and the reservoir and river fisheries are now experiencing record low storage and flows, respectively, since construction of the reservoir. The Bureau of Reclamation should have authority to require at least a somewhat more balanced sacrifice, than what was reported to have occurred in 2002 in this area, if some water users choose not to conserve for the benefit of others.
- Back-to-back drought years provides a variety of challenges to many Montanans. For FWP, it is extremely challenging to ask for voluntary water conservation in multiple drought years, knowing that there can be very little additional that can be sacrificed. This begs the question as to whether voluntary water conservation should be relied on in the long-term for low-flow years, and encourages us all to pursue long-term solutions with greater vigor. Consecutive drought years also lead to forgetfulness of not-so-low-flow years, with citizens and developments becoming lax with respect to flood planning, and a rush to structural controls when flows rise to even normal spring flow levels.

- A continued frustration in 2002 was the lack of drought planning in critical fishery basins (e.g., the Smith).
- Back-to-back drought years have brought yet another challenge to a specific species. As discussed further in Appendix D, restoration efforts for Montana's fluvial (river-dwelling) arctic grayling has been hampered by low flow conditions. This has occurred for a long enough period that the ability to keep this species off the Endangered Species List has also been hampered. Interested parties are doubling their efforts to find creative ways to enhance streamflows in the Big Hole River, but another drought year could exacerbate this difficult situation.
- With many impacts to Montana's fisheries documentable only after low flows occur (except in severe events causing fish kills that FWP is able to respond to quickly enough to document), it is difficult to show the effects of immediate drought in time to motivate non-fisheries advocates to conserve water. This is the nature of the science associated with fisheries biology, but it proves challenging in the throes of drought, to not be able to show immediate impacts.
- There is a broad expectation that FWP staff and tools actually can solve low-flow impacts on fisheries, and that such impacts actually can be fully mitigated. Although Montana's fisheries received a lot of assistance from other agencies and water users, there really are very few tools to deal with low-flow concerns on a broad scale in Montana.
- Drought response in Montana should focus on reducing drought susceptibility in the long run, not solely on emergency response and opportunities for compensation for losses. The Montana Drought Response Plan envisions a proactive approach to drought, but long-term fixes need long-term work, continued incentives and resources to accomplish that work, a variety of tools to undertake such fixes, and the commitment of multiple agencies to work together for common goals. All of this takes much more work on everyone's part, rather than going about our own business until the drought cycle returns, then frantically trying to respond. The "fixes" are often complicated, requiring varied study and cross-jurisdictional collaboration, and patience on the part of water right holders as the wheels of evaluation and funding assistance processes roll forward. Again, these win-win projects often take years to develop, and are difficult to implement successfully under "emergency" conditions.

VI. SUGGESTIONS

As much of our suggestions in previous year-end reports remain relevant, the reader is referred to similar sections in previous FWP Annual Summaries. We have dedicated this section in this year's report to a review of the state Drought Plan. The Plan is almost 10 years old now, and has served the state well. There are some elements that are outdated or not being performed, and the recent drought cycle has provided some learning opportunities. FWP staff have been collating these suggestions for three years, and have summarized them in Table 1 on the following pages.

FWP staff appreciate the opportunity to make these suggestions. They are provided from the perspective of a Committee member responsible for participating with other members in creating and communicating the best statewide drought response strategy possible. We hope other Committee members, and the Plan author, take our comments and suggestions in that context.

Please contact Kathleen Williams with any questions regarding the information in this report.

Summary of Suggested Updates to the 1995 Montana Drought Response Plan

Plan Page #	Plan Section(s)	Suggestion(s)/Rationale
ix+, 20	Varied	Use by the Committee of the Palmer Drought Severity Index appears to have changed from what is envisioned in the Plan. We are not clear as to whether this index has been replaced with a cumulative precipitation index 9as was once proposed), or is just obsolete. The Plan could be updated based on the current status of these information tools.
11	Reporting Conditions	Please delete DFWP from the reference to agencies supplying "water supply and moisture" condition reports.
12	"	The section on the State Electronic BB System could be deleted or replaced with a description of the Committee Website. Note that the sentence committing state agencies assessments of anticipated natural resource and economic impacts by region and industry is not being fulfilled, and may be overly ambitious. The next section on "Press" should be updated – FWP was actively involved in drought-related media relations, without working through DNRC to do so.
14	Drought Assessment	Delete "which begins each spring", as drought impacts can occur any time of year and persist through multiple years.
15	"	I do not believe that agencies are providing all the written impact assessment reports noted.
17	"	The fish and wildlife section needs to be updated. FWP staff will provide suggested replacement text. Suggested changes will likely be more procedural than substantive.
18	"	Do the listed federal agencies report to the DAC as envisioned here? Also, under Energy Production, do toll-free reservoir information phone numbers still exist? Does Commerce currently fulfill the expectations of the Plan? (pp. 18-19)
19	"	Does Commerce conduct the surveys of licensed guides as mentioned under "Recreation"? Commerce staff should review this, as it appears Commerce is the agency envisioned to deal with recreation assessments here. Is there still a toll-free tourism phone line? It would seem the written assessment by Commerce envisioned on pp. 18-19 would be helpful in overall state drought response.
20+	Drought Response	I suggest a phrase be added to match the long-term, proactive element of the Committee's responsibilities, to complement the "Alert" and "Severe" modes. Title it "Ongoing" or "Vulnerability Reduction", or something of the sort. Rather than a "triggering" mechanism, these activities/roles should be continually triggered. Page 20 refers to timing of responses being "preemptive in nature". It would be helpful to note that much of Montana is considered "semi-arid", and localities should presume drought will occur in varying degrees on a regular basis. Again, the reference to the PDSI should be updated. It is no longer available for over 140 stations, statewide. Or, the DAC should coordinate the continued calculation of it at this scale.
22	" State Response, (2)	(2) may be overly ambitious in its expectation that an impact assessment can actually be done, a worst-case scenario defined and commensurate written response strategies can be developed an, if presented to the DAC, implemented.
	(4)	This section could be updated with respect to Internet information provided; its focus could also be broadened.

	" , County Response, 3) " , 7)?"	This seems to connote that Counties may need to monitor some discharge permits. If that is correct, I am curious whether that is happening, or if Counties know of this responsibility or role envisioned by the Plan. It might be helpful to add another entry, in the vein of: "upon lifting of status, the LDAC should recommend to the Commission and DAC long-term drought vulnerability measures that could reduce impacts to water uses and resources, upon return of similar climatic conditions." This would implement an automatic feedback mechanism for suggestions based on local experience, and the opportunity to do something about it. I don't recall DEQ's Water Quality staff reporting on discharge permit non-compliance contacts and the related reporting to the Committee that is referenced here. Similar to a preceding comment, this information would be helpful.
24	"Severe" Drought, State Response	
	" , County Response	It is unclear if "river basin planning committee" is a specific entity. Might this mean "watershed group"? This term is used on p. 23, 6), also. These elements might benefit from some reference to Conservation Districts too.
25	Response Actions, State Agencies, 2)	It is an important responsibility to review "committee membership each year..." to determine if (Committee) membership is comprehensive with respect to interests affected by drought." A more active discussion with the existing Committee membership at the beginning of the year would be helpful in realizing this Plan element.
27	DNRC, 9)	We would appreciate receiving copies of the drought contingency plans for state-owned reservoirs so we can make our field staff aware of local response plans. These are to identify minimum pool levels and minimum instream flows required downstream of the reservoir – we would appreciate knowing what mechanisms are in place to ensure these minimum levels, for the stated purposes, including "protect(ing) fish and wildlife habitat." Page 28, item (6) requires "close monitoring" of compliance with the plans. Without further clarification this sentence implies a hierarchy of values of water use in Montana, which is not the case. Being able to move rights around may allow more flexibility in responding to drought. We suggest the other types of changes in water use that require a Change Authorization from DNRC be added to this section.
28	DNRC, Severe, 4)	
29		It would be helpful to add relevant information to "ongoing activities" actions related to DNRC management of water rights/permits for lessees. (What was learned from the Blackfoot situation in 2000 could be used as an example.) Staff could likely draft text to accurately reflect these responsibilities and opportunities. Also, we suggest there be a drought response element under Alert, that State Lands staff should inform lessees using Land Board water rights (or their own permits) of their status (and implications of in the relevant priority system, and provide water conservation information. Under "Severe", there would seem to reasonably be a heightened responsibility to conserve the State's water in drought conditions by those using State land for personal use. Lands staff should evaluate this entire section to ensure it reflects their water users, not just the fire and forestry elements of State Lands' responsibilities. Please add Yellowstone cutthroat trout and sauger to the species listed as being of "special concern". This portion should probably be broadened, and updated regarding the Internet information that is provided. The elements related to water supply are well covered, but water quality does not seem to get the same level of coverage from the agency, or may not be reported to the DAC as noted. The situation with the Corette stream plant in 2001 is an example. It would be helpful to include a section on how DEQ's instream water reservations for water quality will be/are administered, similar to FWP's related information. Please delete, "also known as Murphy rights,"; we hold instream rights other than those created under the "Murphy" law. On
30	Introduction " , (4)	
33	" , DEQ	
	Introduction,	

	1)	page 31(1), please replace "Murphy Rights" with "FWP rights". Please Insert, "when invited", into this sentence. There are times when we are provided very little opportunity to participate in how small reservoirs are managed under drought conditions.
31	Alert	It would be helpful to incorporate in (2) that FWP hasn't done weekly reports on a continuing basis in drought. More likely we do informal reporting to the DAC in the winter months, weekly reporting in the summer emergency period, and monthly or bi-weekly reporting in-between.
	(4)	Please move this text to "ongoing", this is done on an annual basis.
	Severe, (2)	Please eliminate the parenthetical phrase.
30 and 31		Please incorporate relevant elements of FWP's Wildlife Drought Response Plan here. (See Appendix D of FWP's 2001 Annual Drought Report.
32 and 33	DEQ	We suggest the ongoing activities list include program changes since 1995 (e.g., TMDL water quality planning efforts, etc.). Also, we are unclear about the reference to 3A authorizations and low-flow conditions. Does DEQ grant 3A authorizations in periods of flow that are less than 7Q10 flows (upon which discharge permits are based)? What is the process and criteria for this? Might there be other actions that would be attempted before violations are authorized? How does DEQ enforce their instream water quality flow reservations, when flows fall below their reservation levels? These questions, authorities and procedures could be included in the DEQ section, as they might be helpful in drought response. The Committee should be kept informed of the scale and location of discharge permits that fall into (or are approaching) violation status and actions taken to address related water quality concerns. This comment also applies to pp. 50-51 (DEQ's "Annex"). Also, I believe these are now referred to as "318" permits.
33	Alert, (1) and (2)	The reporting provided from DEQ typically focuses on municipal water supply issues and efforts. The reporting referenced in these Plan entries should also be included. It would appear that this entire section needs to be reviewed and updated.
34		This section refers to the Montana Drought Relief Assistance Reference Guide. This publication was very valuable, but has likely become quite out of date. It would be helpful to update it and thereby keep this reference relevant.
	2)	Does the Montana Department of Agriculture generate the Crop Weather Report? Doesn't the federal Agricultural Statistics Service do this? There may be other updates necessary in this section.
36		Phone number reference may be outdated.
37	NRIS, 1) and 2)	This entire section likely needs to be updated; including references to who provides maps, the use of the PDSI, phone numbers and internet sites. Plus, they have taken on the responsibility of managing the Committee's website, which should be formalized, along with any necessary funding to do so.
38		The Montana Bureau of Mines and Geology does not seem to be as active in the Committee, or drought response in general, as is envisioned here. Should this section be updated, or the Bureau involvement upgraded?
		The reference to the State Climate Center should probably be deleted, correct? (Center was eliminated?)
39		We again suggest that the Montana Drought Relief Assistance Guide be updated to maintain its relevance, and the relevance of the reference to it on this page.
	Bureau of Reclamation	The information on the referenced 1-800 phone number appears outdated. Upon reviewing this reference, FWP staff dialed the number, and heard a recording that Nelson reservoir was at 118% of normal storage and releases were being maintained at 30 cfs. It seems unlikely these conditions could have been current at the time (November, 2001), but the recording refers to its information as "current". This resource should either be updated or interested parties referred to the Bureau Internet site for reservoir information. If the information on the phone line is updated, it could refer not to "currently," but "conditions as of (date/time) were", or the like.

40		The US Geological Survey section may need to be modified regarding references to USGS reporting of groundwater levels. The Internet address also likely needs to be updated.
41	Bureau of Land Management	I'm not familiar with the references RAWs/OMNI soil moisture monitoring stations reference, and do not recall the referenced reporting to the DAC. If this is a current and valuable resource, the reporting would be helpful. If not, the section should be revised.
42		I don't recall the NWS producing weekly PDSI and soil moisture index values for seven regions of the state. Are these provided on their website, or is this section in need of updating? Also, is the reference to the phone service in Maryland relevant? Maybe reference to a website(s) would be more useful?
		The NRCS section should probably be updated as well. Some of the activity descriptions are outdated. Also, many of the programs that could assist in long-term drought vulnerability reduction for Montanans are not described (e.g., ECP, EQIP, WHIP, etc.). Also, it seems too narrow a description to state that NRCS assists with "diversion or irrigation water". Maybe a more descriptive term would be "development of water sources and irrigation efficiency improvements", or something similar.
46		It may be advisable to remove the number of local drought committees included here. In drought conditions, all "Alert" counties are encouraged to form committees (and the number of such counties can change every year). In 2001, <u>all</u> Montana counties were assigned "Alert" status or worse, so only 30 county committees would not be considered fully responsive.
46	(or where appropriate)	I suggest that Soil and Water Conservation Districts should have a section in the Plan to delineate their on-going drought vulnerability reductions activities and specific actions under drought conditions. Although there is discussion of CD responsibilities within DNRC's Plan Annex, CDs should have their own section under local agencies and develop their own entries for issues and roles for Plan participation. It's possible that MACD could assist with a statewide perspective for this section. (They are, after all "soil and water conservation" districts!).
		On a related topic, there were not likely many (any?) local water quality districts in existence when the Plan was drafted. Now that there are several, it may be appropriate to include a section for them too.
51		Again, this section does not seem to adequately disclose authorities (or at least creative response mechanisms) for low-flow effects on water quality.
62	FWP Annex	Delete the following sentence from the "streamflow monitoring" section: "Currently, none of the streams where we have instream rights have gauges installed on them." This is incorrect.
60-69		Some additional updates are needed in FWP's Plan "Annex". When a full revision of the Plan is to be implemented, FWP staff will provide edits to Committee staff, including updates of out-of-date references or information.
69-end	Other agency annexes	Other agencies should review their annexes for items that need updating or revision, or potential additions of creative drought response resources and/or activities. It would be helpful for Drought Committee members to review Annex revisions, to ensure that coordination between agencies and programs is effectively incorporated into the plan. FWP would also appreciate any suggestions others have for updates or changes to the FWP Annex.
Varied	Varied	"Montana Power Company" needs replacing with "PPL Montana", where applicable.
Varied	Varied	Typos: "proceedure" (p. vi); "onsoil", "developingand", and "arenot" (p.27); need an "as" after "such" in last paragraph (p.21); "a", not "an" (p.23); need comma after "purchase of stored water" (p.60); "meeting" should be "meetings" (p. 53); "swater" (p.28(5)); misplaced comma on p.48;

APPENDICES



Montana Fish, Wildlife & Parks

Memo To: Interested Parties
From: Kathleen Williams
Date: February 25, 2002
Subject: February Drought Update

This update was prepared based upon drought updates submitted by fish managers and field biologists on the 2/20/02 Fisheries Division conference call and other relevant updates and information.

General/Statewide

The long-term Palmer Drought Severity Index is calculated at a more coarse scale for Montana than in the past. The current status of the Index is shown at http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif, indicating lingering “Extreme” drought in the south and central portions of the state, and “severe” drought in central, north-central, and southeastern Montana. The 2/12/02 version of the U.S. Drought Monitor shows much of central Montana (and parts of Wyoming) still in “Extreme” drought, with outlying areas classified as “Severe” drought. Far eastern portions of Montana are considered to be in “Moderate” drought. The Drought Monitor can be accessed at <http://enso.unl.edu/monitor/monitor.html>. The graphic is prepared using a variety of drought indices, including, apparently, the Palmer. The graphic appears to be updated weekly.

As shown on the mountain snowpack map (http://nris.state.mt.us/nrcs/Feb02/02_02swehuc.pdf), portions of the upper Marias, Bearpaw, Red Lodge/Rock Creek, and Wyoming basins are showing “extremely below average” snow-water equivalent levels as of February 1st. Many additional areas are showing “much below average” and “below average”, with some areas in southwest and northwest Montana registering as “near average”. These statistics do not track valley moisture, which appears to be quite a bit less than normal. Snow-water equivalent information can be viewed in tabular form, by basin, and locations within these basins, by accessing: http://www.mt.nrcs.usda.gov/swcs/snow/past_up.html - enter the month, date, and year for yesterday, and it will generate the list. (For some reason the option for “today's info” doesn't work for me, but it might work for others.)

To compare the current and projected building of basin snowpacks to historic highs, historic lows, and long-term averages, access the snowpack trend graphs at <http://www.mt.nrcs.usda.gov/swcs/snow/trend.html> (choose the desired basin, then choose “2002”). As an example, the 2/19 trend graph for the Lower Yellowstone basin shows current and projected snow accumulations about midway between normal and record lows (see <http://www.mt.nrcs.usda.gov/swcs/images/trend/lyell02.gif>). For a regional perspective, snowpack conditions for the western U.S., as of the first of the month are at <ftp://ftp.wcc.nrcs.usda.gov/support/water/westwide/snowpack/wy2002/snow0202.gif>.

A “normal” snowpack may not translate to normal streamflow conditions when soil moisture is low, as a higher proportion of precipitation will be absorbed by soils and higher than normal withdrawals are likely. Areas with soil moisture deficits, and the scale of those deficits are illustrated in the “soil moisture anomaly” graphic at <http://www.cpc.ncep.noaa.gov/soilmst/img/curr.w.anom.daily.gif>. Streamflow forecasts, at specific stream gauge locations can be found in tabular form at <http://nris.state.mt.us/nrcs/Feb02/sfreport.html> and graphic form, statewide, at http://nris.state.mt.us/nrcs/Feb02/02_02stfp.pdf. These numbers assume NORMAL spring precipitation. The forecasts are liberal if we have a dry spring on top of current snowpack trends.

More detail regarding forecasts, by basin, can be found at <http://www.mt.nrcs.usda.gov/swcs/forecast/bor.html>. Remember that the numbers in the tables are based on VOLUME (i.e. acre feet of flow). The 50% forecast numbers are the only ones with “% of Average” already calculated, but you should only use the 50% numbers if the forecasts for your area for the future are for “normal” precipitation. If you want to be more conservative, use the AF numbers in the 70% or 90% column and divide that by the long-term average (far right column), for the % of average applicable to drier forecasted conditions.

The ‘percent of normal” precip map for the water year (10/1-9/30) is found at http://www.wrh.noaa.gov/Greatfalls/text/wateryear_percent.html. Precipitation as percent of normal for January is at <http://www.wrh.noaa.gov/greatfalls/text/janpcntnorm.html>. Though Montana’s normal rates are low (and a couple big storms can make a big difference), the graphics are cause for concern. According to the experts, February is usually drier in Montana than January, and March is usually wetter than February. As of 2/20, we basically have about 5 weeks left in our typical snow accumulation period.

Another helpful graphic is located at http://www.cpc.ncep.noaa.gov/cgi-bin/anom_realtime.sh. This graphic is on a national basis, but is updated daily and displays running 30-day (or 90-day) departure from normal precipitation statistics. From the link, choose the bottom-most entry in the column (for most recent date) in either column. The result is four graphics, with “% departure from normal precip” in the lower left. As an example, the accumulated departure from normal precipitation trends from November 19 to February 19 is the lower left graphic at http://www.cpc.ncep.noaa.gov/products/precip/realtime/clim/90day/20020219_90day.gif.

The Surface Water Supply Index map for February 1st blends factors for soil moisture, precipitation, snowpack, and reservoir storage, adjusting these factors for which are most determinant at the time. As shown at <http://nris.state.mt.us/nrcs/swsi2002.html>, the following streams are already in a concern situation:

Extremely Dry (rating of -4.0 to -3.0)

Swan (-3.8)
Powder (-3.7)
Stillwater (-3.5)
Marias above Tiber (-3.3)
Milk (-3.3)
Bighorn blw Bighorn Lake (-3.3)
Clarks Fork (-3.2)
Smith (-3.0)
Big Hole (-3.1)
Boulder (Yellowstone) (-3.1)
Rock/Red Lodge Creeks (-3.1)

Moderately Dry (rating of -2.9 to -2.0)

Beaverhead (-2.9)
Jefferson (-2.9)
Birch/Dupuyer (-2.9)
Yellowstone blw Bighorn (-2.9)
Sun (-2.8)
Tongue (-2.8)
Teton (-2.7)
Shields (-2.7)
Clark Fork abv. Milltown (-2.7)
Musselshell (-2.7)
Dearborn near Craig (-2.7)
Boulder (trib. to Jefferson) (-2.5)

Yellowstone abv Bighorn (-2.5)
Little Bighorn (-2.5)
Marias below Tiber (-2.4)
Mission Valley (-2.3)
Tobacco (-2.3)
Ruby (-2.2)

Missouri below Ft. Beck (-2.2)
Gallatin (-2.1)
Missouri above Ft. Peck (-2.1)
Little Bitterroot (-2.1)
Stillwater/Whitefish (-2.0)
Yellowstone abv Livingston (-2.0)

Reservoir storage conditions and projection graphs would normally be accessible via <http://www.gp.usbr.gov/wareprts/mtgraph0.htm>, but it appears this Bureau of Reclamation link is also off-line due to Department of Interior issues with Indian trust accounts.

Streamflows at USGS gauges are available through http://water.usgs.gov/cgi-bin/daily_flow?mt, but many are likely reflecting icing effects and short-term or micro-climatic conditions, rather than indicating long-term flow trends.

The Montana Drought Monitoring website from 2001 has been reorganized and updated for 2002. It is located at <http://nrjs.state.mt.us/drought/>. Committee members and website administrators welcome and request suggestions for postings and site organization. Use the "Comments or Questions" button to send an e-mail message and/or attachment.

Region 1

The region, as of 2/20, had received some good recent snowfall events. Most basins were showing about normal snowpack figures for this time of year. The Kootenai was about 115% of normal as of 2/20, which is encouraging. Due to lack of soil moisture, there will likely be reduced streamflows, but risks do not seem critical at this point. Most reservoirs are in reasonable shape. Ice pack and snow cover on the lakes is fairly light, so no related winter kills are expected. Region fisheries should make it through the winter fairly well.

A risky area for the summer may be the Thompson drainage, as much of the watershed is low-elevation, run-off comes out early, and soil moisture content is low. There is very little diversion from the Thompson, nor regulation, so FWP actions here will be primarily hoping for consistent and continued moisture in the basin. If positive climatic conditions don't occur, angling restrictions may be necessary.

The Flathead Lake/Kerr Dam drought study, which has been going for years, will speed up, as FERC recently ordered PPL Montana to complete a draft drought plan by March 1st. FWP staff met with the Tribes on 2/21 and will learn more about progress and the Tribal role.

Electricity prices seem to have modified enough that there may not be as much pressure to modify reservoir release regimes as last year. The Columbia Falls Aluminum plant is bringing some production back on line. The intense power controversies from last year seem to have calmed down in the last six months. There have been some staffing changes at Flathead Electric Cooperative.

Flathead Lake levels are currently above normal for this time of year, but are dropping due to concerns about dock icing at higher levels, as well as positive runoff predictions. The level is about 3 feet above low pool; low pool levels typically occur around April 15th.

Region 2

Most of the area, excluding the Upper Clark Fork, according to the January Palmer Drought Severity Index had moved from “severe drought” to “mild drought”. Conditions appear to be improving, except in the Upper Clark Fork. High-risk streams are Rock Creek and the Flint Creek/Georgetown areas. FWP has Murphy Rights in Rock Creek, and will continue working with the Advisory Group in the Georgetown situation. The Bitterroot and Blackfoot received quite a bit of additional moisture since January 1st, so the Palmer may overstate the severity of the situation in these areas.

Streamflow forecasts are below average for the region, and well below average in the Upper Clark Fork. Snowpack is near 100% in the Bitterroot, though Painted Rocks Reservoir still needs to fill.

Region 3

As of 2/20, the region had received very little precipitation over the last month. The Missouri Headwaters, Jefferson, and Upper Yellowstone snow-water equivalent was about 77% of average. The Madison and Gallatin are better (86-89% of average), but not very encouraging considering the cumulative soil moisture deficit in the area. The snow-water equivalent as percent of average has been declining, when increasing statistics were hoped for.

At-risk streams include the Upper Big Hole, where there is a local drought plan and focused mitigation/research activities that will likely be very active again this year. The Upper Red Rock River area is also at risk, and was totally dewatered in sections last year after Lima Reservoir was emptied. We expect to try to be more proactive there this year than last, when staff did some emergency coordination with landowners to try to keep some water in the stream. The Jefferson is also drought-prone, and has an active drought plan and Watershed Council. TU and FWP staff and water users are considering experimenting with a temporary ditch sealant that could result in more water being retained in the river. The Lower Gallatin and Shields also are drought-prone with heavy irrigation demands. The Lower Gallatin (below Gallatin canyon) has not provided much opportunity for retaining water and maintaining acceptable water temperatures. The Shields has an active watershed group, and, uniquely, is a location where some irrigation ditches can be “friendlier” to fish at certain times than the River.

The Beaverhead is also a drought priority for the Region. With Clark Canyon at record low levels, we may see record low late summer/early fall flows in 2002. Not much could be done to improve flows in the past, but there is a newly-formed watershed committee that may help. Flow projections in the Upper Yellowstone are also dire, but there isn’t much that can be done flow-wise there.

Region 4

2/20 conditions were quite bleak in this region. Conditions east of the Divide were much worse than those to the west. There was a bump in mountain precipitation in late January/early February, but nothing since. The 2/I Gibson reservoir April-July inflow predictions (when things were looking good) was 60% of normal. It’s not likely any better than that now, and seems typical for the entire area. With repeated back-to-back drought years, ground water is in very short supply. Great Falls precipitation for the year is about 33% of normal. Reservoirs will

be in worse shape this year than last, and last year was quite serious. The Bean Lake aeration project appears to be successful in keeping oxygen levels at a survivable rate in this pothole lake. Bynum may need to be “written off”, as the reservoir only receives flood flows from the Teton, which likely will not occur, unless conditions change dramatically.

Fortunately, Canyon Ferry will still likely release 2,800-3,000 cfs, so the Missouri will likely be a bright spot in the region, though water temperatures may still become a problem. The Dearborn is the “ace in the hole” for the Missouri system (still whirling-disease free), but there isn’t much that can foreseeably be done by FWP to increase flows there in the near future. A water conservation project is being planned on the South Fork, but that will not “save” the Dearborn, but will help, if it moves forward. There has been discussion of a general meeting in White Sulphur Springs in the next month or so; water in the Smith will likely be one of the topics for that meeting.

The Sun has a watershed group in place, but limited water availability. FWP staff have been focusing on monitoring and potential flow enhancement on Big Spring Creek. Discussions of potential water conservation are continuing, but slow, and may result in some long-term conservation opportunities. Little Prickly Pear Creek is also a drought priority area for regional staff.

Region 5

All but two drainages in the region are in the “extremely dry” range of the 2/1/02 SWSI; the others are not much better. The Musselshell is the drought impact “poster child” for the region. 2/20 snowpack there was 91% of average, but Bair and Martinsdale reservoirs are basically empty. Deadman’s storage is 16% of capacity and inflows are miniscule. A recent local news article noted that there may be no irrigation in the lower Musselshell this year. Communities dependent on the Musselshell for their water supply are hurting severely.

The middle Yellowstone is showing a snow-water equivalent of 76% of average - above last year, but soils are so dry that expected flows are in the upper 60s for % of average. The flow expectations in the Billings area are 74% of average, getting worse downstream. The Stillwater and Boulder gauges are showing icing problems, but the last readings showed flows about 75% of normal for this time of year. The Clarks Fork snow-water equivalent is 79% of normal (compared to 49% last year), but the Rock/Red Lodge basin is 33% of average (worse than last year).

The Bighorn basin feeder mountains are 68%-71% of normal for snowpack, but Boysen and Buffalo Bill reservoirs are very low, with plans to retain flows to address deficit storage levels, thereby limiting downstream flows to the Bighorn River. The Bureau’s last prediction for Bighorn releases would be flat-lining the River at 1,500 cfs, which would result in a spring lake level 16 feet below full pool. The reservoir is currently half-full, below a level that would allow launching at any ramp, and the level continues to drop.

Regarding what can be done, obviously a local community priority will be to fill Bair and Martinsdale, but if a trickle can be kept between pools (and water temperatures low enough) in the section above Deadman’s Basin, that might keep the “miracle fish” alive in that section of the river. It is important for the community to discuss whether irrigation can even be initiated in the lower basin. If it can’t, there may be some opportunities to provide fishery flows, rather than

losing both the fishery and crops due to an over-ambitious water allocation strategy. Although water will continue to be released out of Bighorn Reservoir, by keeping fish compacted in cold water in a small area, over an extended period of time, we lose the younger year classes to predation, and growth rates are low for the larger fish. When flows come back, there will be fewer fish and fewer large fish.

The Corette steam plan was satisfied with their pumping option from last year, as well as a secondary intake, so the proposal to dam the river (span it to raise water to their intake) near here should not occur this year. The Cedar Park subdivision continues to work to get online for City water. We don't know if the timing will resolve their inability to comply with a FWP call for senior water this year or not, but are hopeful. FWP staff have been asked whether the City of Billings should be further encouraged to implement water rationing. City staff say that rationing instills a scarcity mentality in residents, and actually increases consumption. The City has both raised water rates and eliminated the lower relative cost of consuming a higher amount of water, which should help to reduce per capita water use.

Region 6

Ft. Peck Reservoir will be 13 feet below normal pool for this time of year at the end of February, with an elevation of 2,217 feet above mean sea level. The average discharge will be 5,000 cfs.

Fresno Reservoir is currently at 8% of normal storage and is anticipated by the BOR to decrease to 4-5% of normal storage before any water comes in this spring. Snow pack in the Milk River drainage, as of 2/19, was 73% of average.

Nelson Reservoir is at 20% of normal full storage and 55% of normal for this time of year. Sufficient dead storage in this reservoir should allow this fishery to survive another drought year, but not without significant losses.

All streams are and will be in tough shape in the western portion of Region 6.

Region 7

No conference call update. See Drought Committee website for general climatic conditions in southeast Montana.

Helena Office/Other

- Comments from the field on the draft fishing closure policy were due to Ken McDonald on 2/22. Helena staff plan to work on a press release after comments are received on the policy. Drought priority streams will be included in the press release, as identified in the February conference call. Region 3 staff suggested that the press release not identify the above-listed "priority" streams as the only ones that might be subject to fishing closures. Closures might have to be implemented more broadly. The above-listed priority streams were those where Region 3 staff felt there are high risks, but also possibly where something can be done to reduce risks.
- Regional fish managers and Helena staff discussed how they felt about FWP's current "fish salvage" (emergency relocation) policy. Fish managers expressed concern about

the staffing ability to conduct fish salvage projects. Region 3 had similar concerns, and previously conducted no salvages, but approved salvages last year at two trouble spots where fish pool up behind irrigation headgates. A local TU group requested they be able to move these fish last year. A collection permit was issued for the salvage, which specified the local biologist would supervise the salvage, the operation would be specific to those two sites, and also designated the receiving water. This is a limited application, and cannot be done for many places. Region 2 did one rescue last year for adult bull trout caught in a pool in the North Fork. Fish managers feel that the existing fish salvage policy is adequate, which says,

"Changing water levels in streams and lakes often cause fish to become stranded in areas where survival is greatly reduced. The cost of salvaging those fish is usually high and the benefit to the water receiving the fish is often questionable. Although salvage is not usually justified economically nor biologically, there may be some public relations value for salvage in some situations. Whenever circumstances occur where salvage needs to be considered, the Regional Fish Manager will investigate and determine what action should be taken."

A collection permit is a good idea for application of the policy. It should also be stressed in any related public information that when conditions are bad enough to cause stranding, that appropriate receiving waters for rescued fish may be non-existent. Also, if salvaged fish are added to an area containing fish, the receiving population will likely be adversely affected. Bottom line is, as noted in the policy, that the opportunities to salvage in a cost-effective and successful manner are likely extremely rare. This may also be a good topic to add to the FAQ we developed for drought in 2000.

- Most field staff are willing to input fishing status information again this year into the Internet reporting site that was invented last year. The Special Projects Bureau Chief will follow up to see if the request that the entries be updateable (rather than having to re-enter all data each time) can be fulfilled. Field and Helena staff agreed that active information entry by field staff could begin in June. Information can be general until then, and not stream-by-stream, but more basin-by-basin. The Division Administrator, SP Bureau Chief, Water Program Manager, ConEd, and GIS program staff will coordinate on early-season reporting – how to do it best without burdening field staff.
- Water Program contract staff has been contacting fish managers and biologists to get further information on quantitative and qualitative conclusions regarding how drought conditions have and are affecting fish populations. The results are being summarized and will be sent out for field review and confirmation.
- Similar to last year, the Future Fisheries Improvement program is offering a special streamflow-related funding window for grant applications that can benefit streamflow this summer season. Applications for this special funding window are due 4/1. If any field staff need assistance from the Water Program Manager to get projects readied for this deadline, please let her know.
- The Governor's Drought Advisory Committee is sponsoring (with MACO) a local drought coordinators training session, scheduled for 3/20 in Helena. Kathleen has been asked to give a presentation, which she may rope the R4 manager into. She will coordinate with him directly on need and scheduling, and will know more about the needs after the 2/26 Committee meeting.

- The



Montana Fish, Wildlife & Parks

Governor's Drought Advisory Committee is meeting monthly, with the next meeting on 2/26 in Room 152 of the Capitol. The Committee has designated all Montana counties to be in "Continued Drought" status, and the Governor has requested continuation of the statewide National Disaster Designation from 2001. She has also provided her support for any Montana County requesting CRP haying and/or grazing in 2002.

- Fisheries, Wildlife, Parks, Conservation Education, and Director's Office staff met on 2/10 to discuss Department-wide drought reporting and response strategies for 2002. The Water Resource Program Manager met on 2/21 with Wildlife Division and regional staff to further discuss wildlife-related reporting and response.
- The **next Fisheries Division conference call** was scheduled for 9 a.m. on 3/13, but has been changed to **3/18 at 1 p.m.** Regional wildlife managers may join regional fish managers on the call. Kathleen will get a revised call-in number and send to regional fish staff and wildlife division contacts.
- Parks Division staff report that individual site conditions for both fishing access sites and state parks will dictate how these two types of sites are managed for recreation during any fire conditions that may arise in 2002. In all cases, management of both types of sites will follow the same fire and/or public use restrictions that are in force in a particular county or area. Parks Division staff are not currently conducting any specific drought response activities, but will provide updates via these reports regarding fire-restriction-related activities. At the present time there are no specific anticipated drought-related risks or impacts to Parks Division sites.

Cc (electronic):

FWP Director, Commission Members

T. Palmer – FWP, ConEd (for forwarding to regional Information Officers)

Fisheries Division staff – Helena

FWP "drought biologists/managers"

J. McCarthy; G. Erickson; T. Reilly

FWP Regional Supervisors – Kalispell, Missoula, Bozeman, Great Falls, Billings, Glasgow, Miles City

Governor's Drought Committee Staff (including for posting on Committee Website)



Montana Fish, Wildlife & Parks

Memo To: Interested Parties
From: Kathleen Williams
Date: March 19, 2002
Subject: March 18th Drought Update

This update was prepared based upon drought updates submitted by fish managers on the 3/18/02 drought conference call and other relevant updates and information. Wildlife information was provided from Wildlife Division staff.

General/Statewide

The long-term Palmer Drought Severity Index is calculated at a more coarse scale for Montana than in the past. The current status of the Index is shown at http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif. The 3/16 version indicated lingering "Extreme" drought in the south and south-central portions of the state, and "severe" drought in central and southeastern Montana. This is somewhat improved over the February conditions. The 3/16/02 version of the U.S. Drought Monitor shows much of central Montana (and parts of Wyoming) still in "Extreme" drought, with outlying areas classified as "Severe" drought. Far eastern portions of Montana are considered to be in "Moderate" drought. See <http://enso.unl.edu/monitor/monitor.html>.

The 3/1/02 mountain snowpack map is located at http://nris.state.mt.us/nrcs/Mar02/03_02swehuc.pdf. Again, some areas are showing improvement over February conditions. These statistics do not track valley moisture, which appears to be quite a bit less than normal. Snow-water equivalent information can be viewed in tabular form, by basin, and locations within these basins, by accessing: http://www.mt.nrcs.usda.gov/swcs/snow/past_up.html - enter the month, date, and year for yesterday, and it will generate the list. (For some reason the option for "today's info" doesn't work for me, but it might work for others.)

To compare the current and projected building of basin snowpacks to historic highs, historic lows, and long-term averages, access the snowpack trend graphs at <http://www.mt.nrcs.usda.gov/swcs/snow/trend.html> (choose the desired basin, then choose "2002"). For a regional perspective, snowpack conditions for the western U.S., as of the first of the month are at <ftp://ftp.wcc.nrcs.usda.gov/support/water/westwide/snowpack/wy2002/snow0203.gif>.

A "normal" snowpack may not translate to normal streamflow conditions when soil moisture is low, as a higher proportion of precipitation will be absorbed by soils and higher than normal withdrawals are likely. Areas with soil moisture deficits, and the scale of those deficits are illustrated in the "soil moisture anomaly" graphic at <http://www.cpc.ncep.noaa.gov/soilmst/img/curr.w.anom.daily.gif>.

Streamflow forecasts, at specific stream gauge locations can be found in tabular form at <http://nris.state.mt.us/nrcs/Mar02/sfreport.html> and graphic form, statewide, at http://nris.state.mt.us/nrcs/Mar02/03_02stfp.jpg. These numbers assume NORMAL spring precipitation. The forecasts are liberal if we have a dry spring on top of current snowpack trends.

More detail regarding forecasts, by basin, can be found at <http://www.mt.nrcs.usda.gov/swcs/forecast/bor.html>. Remember that the numbers in the tables are based on VOLUME (i.e. acre feet of flow). The 50% forecast numbers are the only ones with "% of Average" already calculated, but you should only use the 50% numbers if the forecasts for your area for the future are for "normal" precipitation. If you want to be more conservative, use the AF numbers in the 70% or 90% column and divide that by the long-term average (far right column), for the % of average applicable to drier forecasted conditions.

Precipitation as percent of normal for February is at <http://www.wrh.noaa.gov/greatfalls/text/febpcntnorm.html>. Although this graphic shows some above-normal precipitation, the cumulative conditions since the beginning of the water year (10/1) are still quite dry. See http://www.wrh.noaa.gov/Greatfalls/text/wateryear_percent.html. When March information is incorporated, conditions in the north-central and northwest will likely show improvement. As of this writing, there is less than 2 weeks remaining in our typical snow accumulation period.

Another helpful graphic is located at http://www.cpc.ncep.noaa.gov/cgi-bin/anom_realtime.sh. This graphic is on a national basis, but is updated daily and displays running 30-day (or 90-day) departure from normal precipitation statistics. From the link, choose the bottom-most entry in the column (for most recent date) in either column. The result is four graphics, with "% departure from normal precip" in the lower left. As noted in other statistics, recent precipitation events are helping in the western 1/2 of the state.

The Surface Water Supply Index map for March 1st blends factors for soil moisture, precipitation, snowpack, and reservoir storage, adjusting these factors for which are most determinant at the time. As shown at http://nris.state.mt.us/Nrcs/Mar02/swsi03_02.jpg, the following streams are of concern:

Extremely Dry (rating of -4.0 to -3.0)	Moderately Dry (rating of -2.9 to -2.0)
Bighorn blw Bighorn Lake (-3.8)	Beaverhead (-2.9)
Stillwater (-3.7)	Yellowstone abv Livingston (-2.9)
Rock/Red Lodge Creeks (-3.5)	Little Bitterroot (-2.8)
Yellowstone blw Bighorn (-3.5)	Birch/Dupuyer (-2.8)
Powder (-3.4)	Smith (-2.8)
Milk (-3.4)	Tongue (-2.7)
Clarks Fork (-3.4)	Teton (-2.5)
Shields (-3.4)	Marias below Tiber (-2.4)
Boulder (Yellowstone) (-3.3)	Ruby (-2.4)
Big Hole (-3.2)	Sun (-2.4)
Yellowstone abv Bighorn (-3.2)	Stillwater/Whitefish (-2.3)
Marias (-3.2/-3.1)	Missouri below Ft. Beck (-2.2)
Musselshell (-3.1)	Gallatin (-2.2)
Jefferson (-3.0)	Missouri (entire length) (-2.1/-2.2)
Boulder (trib. to Jefferson) (-3.0)	Dearborn near Craig (-2.1)
Little Bighorn (-3.0)	Fisher (-2.0)
Clark Fork abv. Milltown (-3.0)	Clark Fork, Bittr. to Flthd. (-2.0)

Reservoir storage conditions and projection graphs are again accessible via <http://www.gp.usbr.gov/wareprts/mtgraph0.htm>. Streamflows at USGS gauges are available through http://water.usgs.gov/cgi-bin/daily_flow?mt, but many are likely reflecting icing effects and short-term or micro-climatic conditions, rather than indicating long-term flow trends.

The Montana Drought Monitoring website from 2001 has been reorganized and updated for 2002. It is located at <http://nris.state.mt.us/drought/>. Committee members and website administrators welcome and request suggestions for postings and site organization. Use the "Comments or Questions" button to send an e-mail message and/or attachment.

Region 1 (Kalispell)

Fisheries. Several late season Pacific fronts have been cold with little moisture but they sustained and even augmented snowpacks slightly. 3/18 snowpack ranged from 105% of normal for that date (Flathead) to 121% (Kootenai).

Low elevation snowpacks are not as promising. The Ashley Lake watershed is predicted to have only half normal runoff. Flow releases, even as a percentage of storage as specified in the water management agreement, would leave Ashley Lake down 2-3 feet for summer. FWP has contacted the water right holders about modifying flow releases similar to last year to bring the lake closer to full.

The drought management plan for Flathead Lake is now several years overdue. That led to a summer drawdown last year and reduced flows downstream from Kerr Dam. FERC ordered PPL Montana to take the lead in completing a plan for this year. The draft plan calls for reduced drafting in spring when snowpacks are low, up to one foot summer drawdown, and then reduced flows downstream. Public meetings are scheduled.

Wildlife. More rain and snow is occurring in northwest Montana. Although snowpack is less in low elevation winter ranges we have significant amounts up high still (above normal). Perfect winter actually, winter range forage is available yet snow pack is up in the higher elevations. The "spring turkey" outlook is good as far as over-wintering populations in Region 1, hunting access remains poor however due to small private ownerships in the Flathead Valley.

Game damage focus in the region is primarily on bears and turkeys with lions, deer and elk thrown in at various times. The bear damage outlook in terms of conflicts is always high, especially this year due to heavy snow up high forcing the bears down to lower elevations. Staff are preparing to deal with resulting issues.

Region 2 (Missoula)

Fisheries. As of March 1st, the Surface Water Supply Index (SWSI) for the region was showing a slight improvement over February figures, except for the Upper Clark Fork. Snowpack level for the Clark Fork below Milltown was 116%; Bitterroot was 95%; Upper Clark Fork was 92%; and the Blackfoot was 92% of normal. Mountain snowpack conditions in the region are much better than last year. For example, the Blackfoot basin snowpack average is 136% above last year's levels at this time.

Streamflow forecasts are below normal for much of the region, with the Upper Clark Fork being much below normal. These forecasts assume continued normal precipitation.

As for reservoirs, East Fork Rock Creek is at 54% of average storage - better than last year at this time. Nevada Creek is at 103% of average storage for this time; Painted Rocks is 62% of average at this time.

Since the above statistics were published, there have been several additional storms through the area, and more precipitation predicted.

Wildlife. The region is generally below normal for precipitation, with conditions getting drier as you move from west to east. Snowpack in the higher elevations is near normal in the western portion of the region along the Idaho border, and decreases going east and south toward the Continental Divide. Big game animals appear to be in good condition as a result of the easy winter, however, soil moisture levels are low, and winter range forage growth this spring and summer has the potential of being fair to poor unless rainfall is well above normal. Residual nesting cover for upland birds and early nesting waterfowl may be in short supply this spring.

Region 2 increased White-tailed deer antlerless B licenses in some Hunting Districts, added the 8 day ES season for WTD in HDs 200, 201 and 202, increased antlerless elk permits in 2 HDs, and allowed A-7 license holders to hunt on private land beginning Sept. 1 in HDs 204 and 261. Generally this increase in permits/B licenses is in response to higher numbers of animals and increasing game damage complaints, all compounded by drier conditions that reduce landowner tolerances to wildlife when hay prices are high and less native forage is produced on rangelands.

Spring Turkey conditions are good, similar to last year. We have seen little game damage this winter due to the mild winter, however, the cold and snow the past 3 weeks has resulted in several instances of elk damage to haystacks, particularly in the Bitterroot area.

Region 3 (Bozeman)

Fisheries. As of 3/18, streamflow conditions and prospects were still grim, but looking slightly better with recent snow events. Mountain snow-water equivalents in the area ranged from 80% (Jefferson) to 88% (Madison) of normal, with the rest of the region's mountain snowpack figures falling between these levels. These levels are encouraging, though a cumulative soil moisture deficit tempers the initial positive reaction.

The Yellowstone River has been at record low levels almost continuously for a year. There have been no reports of severe icing events affecting fisheries in the region.

Wildlife. Current drought conditions may possibly be affecting calf/cow elk ratios, which winter surveys indicate are in the 20s in much of R-3, as opposed to long term averages of > 30 calves per 100 cows.

2002 hunting season changes to address elk numbers/drought in the region included:

- Initiated 8-day either-sex elk seasons in 7 HDs
- Extended antlerless elk permits in 3 hunting districts
- General season antlerless elk hunting last week in 2 HDs
- Expansion of A-7 antlerless elk hunting opportunities

Spring Turkey conditions are good, similar to last year. Levels of game damage have been average, to lower than average, due to mild winter conditions.

Region 4 (Great Falls)

Fisheries. In general, things are looking up! River flows are not reportable, as most gages are indicating icing problems. Belt Creek is nearly dry all the way to Riceville (Sluice Boxes Park entrance), which is very unusual. This reflects the extreme groundwater deficit in this area.

Missouri River conditions are better this year than last year at this time. Snowpack for the "Missouri Headwaters" is 85% of normal as of 3/18; a small improvement from March 1, when it was 82% of normal. For comparison, the snowpack was only 62% of normal on March 1 of last year. The Bureau of Reclamation forecast for March 1 of last year was for 56% of normal runoff (with 62% of normal snowpack). This year, we had 82% of normal snowpack on March 1, but the BuRec is still only forecasting 57% of normal runoff. Regardless, they think Canyon Ferry will fill and we may see the river below Holter return to 4100 cfs (our preferred minimum flow) in July. The river below Holter is currently 3180 cfs.

Conditions have steadily improved on the Front. Sun/Teton/Marias snowpack started poorly (a depressing 57% of normal on Jan 1) but improved to 80% on Feb 1, 89% on March 1, and now stands at a whopping 101% of normal. The snowpack was only 51% of normal there on March 1 of last year.

The snowpack at the two SNOTEL sites in the Sun River drainage was 79% of average on March 1 of this year, compared to only 60% of average on March 1 of last year. Unfortunately, the BuRec is only estimating 50 cfs as the most probable flow for the Sun River downstream from Gibson/Diversion dams, which is only half of our recommended absolute minimum flow. Snowpack at these two sites has since improved to 96% of average, which is very good news. April 1 forecasts hopefully will show improved river flows and reservoir levels on the Front.

Conditions have improved somewhat in the Smith/Judith/Musselshell area, but not as dramatically as along the Front. Snowpack was 80% of normal on Feb 23 and improved to 86% of normal for 3/18. There were high hopes for additional precipitation in the Smith drainage over the last few days, but the Showdown ski report showed not nearly as much new snow as was predicted for the past week or so. Snowpack was only 65% of average on March 1 of last year, compared to 84% of average for March 1 this year.

Wildlife. Drought conditions were principally and previously considered in the setting of mule deer B licenses numbers in R4. Elk harvest strategies remain aggressive in terms of numbers of antlerless licenses available and extended and/or general season either-sex season types offered.

As far as current conditions/effects on big game and birds (waterfowl and upland), mule deer recruitment may be in the initial stages of a downward trend, owing to poor fawn survival in north-central Montana. Spring recruitment surveys will be used to assess this trend. Upland game birds dependent upon residual vegetation for nesting and successful brood rearing (sharp-tailed grouse, sage grouse) are expected to fare poorly without significant and early spring rains.

The outlook for spring turkey is difficult to predict. Most turkeys in R4 are associated with mountainous or mountain foothill situations, where the direct effects of drought are not as pronounced and may be buffered by other physical and climatological considerations.

Regarding game damage, so far through the 2001-2002 winter season, most depredation situations have involved elk. Considerable complaints addressing elk use of pasture and range grasses have been received. Competition for these grasses where little production was noted last year is extreme. Mule deer

depredations have been surprisingly minimal. Most chronic mule deer depredation situations (most of which are haystack depredations) have been addressed in previous years with an aggressive haystack protection effort. An abnormally high number of antelope (pronghorn) depredation situations have been investigated this winter, owing to the tendency of these animals to group in large numbers and to concentrate near open water supplies.

Region 5 (Billings)

Fisheries. Deadman's Basin has risen from 16% of normal storage to 29%. The Yellowstone in this area is flowing about 63% of average for this time. Mountain snowpack for the Yellowstone is 83%, but flow is forecast at 71% of normal.

The mountains feeding Bighorn reservoir gained in snowpack recently (from 70% to 79%), and the inflow is finally meeting the outflow level. The lake level is not generally rising, but it's stopped falling. The Bureau of Reclamation communicated that anglers and irrigators were asking them to reduce outflows further (below the 1,500 cfs level that already eliminates 60% of side-channel habitat). With recent snows, and ideas to modify launching ramps, these requests may be deferred.

Data from mountain lake surveys shows that some high mountain lakes may be down as much as three feet in elevation, which may mean the unusual case of high-mountain lake winterkills. Mountain lakes will be checked again by FWP staff in July.

Wildlife. Current conditions will have a greater effect on ducks than geese, which nest along rivers and large reservoirs. Geese which are grazers, rather than pond feeders like ducks, will be less affected by poor foraging due to low water levels. A lack of residual nesting cover will be detrimental to most upland birds. Pheasants will be the least affected in core areas around drainages.

Regarding hunting season changes, the Region may see restricted waterfowl bag limits because of poorer nesting conditions. Staff have recommended seasons on antelope and elk that are intended to increase the kill and will probably do the same with antlerless mule deer permits.

Region 5 staff do not expect the spring turkey season or success to be affected by current drought conditions.

The Region has experienced a fair amount of game damage, although different than in the past. Ranchers who made significant investments in hay are requesting stackyard materials to protect their investment. There have also been a couple of late antelope hunts on wheat fields, which is a first in this Region.

Region 6 (Glasgow)

Fisheries. The Upper Milk drainage is at about 100% of average snowpack, which is much improved over past conditions. Fresno storage is 5% of capacity; Nelson is at 20%. There is not much prairie snow, but general conditions appear to be improving, and six inches of snow are forecast for the evening of the 18th.

Prairie ponds in the western portion of Region 6 are very low; the forecast additional snow may help.

Mountain snowpack feeding the mainstem Missouri was at 72% of normal on 3/4. Ft. Peck elevations are predicted to rise three feet between late March and May. This would allow the forage species and pike and perch to successfully spawn.

Wildlife. As of 3/18, Region 6 had received recent snow, and there should now be enough moisture to give vegetation a start this spring. This will help recruitment of both big game and upland game birds. The scale of the recruitment will depend on the Hi-Line receiving additional moisture this spring and throughout the summer.

Due to the severity of the drought in south Phillips County, compared to the rest of Region 6, we have not recommended going to either-sex mule deer, only the "A" license. We have also not recommended an antlerless mule deer "B" license in this area (HDs 620, 621 & 622). Mule deer recruitment in these HDs has not measured up to the good recruitment in the balance of the region.

Region 6 experienced a white-tailed deer die-off late last summer and early fall due to an EHD outbreak. This outbreak was related to the dry conditions in August and September between Havre and Saco, and a large number of whitetails were lost. As a result, Region 6 reduced to one the number of antlerless whitetails that a hunter could take during the 2001 season in the HDs (600, 610, 611, 620, 621, 622, 680 and 690) in this area. In the balance of the Region, a hunter could have taken two antlerless whitetails. The same bag limits were recommended for the 2002 season.

The spring turkey season in Region 6 should be normal. Game damage has been light in most parts of Region 6 in 2001, and so far in 2002. Landowners in selected areas have reported some damage caused by mule deer, white-tailed deer and elk. Antelope in HD 690 south of Chinook caused the greatest reported game damage. In most cases we recommended, and the Commission approved, increased antlerless mule deer and doe/fawn permits for the 2002 season.

Region 7 (Miles City)

Fisheries. Snowpack feeding the Tongue basin (Bighorns) is 70-75% of normal – fairly low, with very dry ground in Wyoming and Montana. Wyoming has small impoundments on the system that haven't been filled. Most agree that anything that comes out of the mountains in this basin (unless it's a sudden slug of water that can't all be captured) will be captured upstream of Montana. The Reservoir is at 30% of capacity, which isn't very far from average. Not much recharge is expected. The two major water user groups dependent on the Tongue are preparing for very little available water again this year. Conditions could change with spring storms – a few years ago, one precipitation event filled the reservoir to capacity. There will be two water commissioners brought on this year, and expanded water measuring. Last year, purchase of Tribal water provided for some additional irrigation and streamflows, but storage is not at the point where Tribal water has accumulated, so this may not be an option this year.

The Powder basin is also experiencing 70-75% of normal snowpack at this time. The system is unregulated, so there will likely be the typical rush of mountain runoff, then not much after July. Similar to last year, August, under these conditions, will mean little connection of the Powder to the Yellowstone River. This would be the third year in a row with these conditions, and likely means another year where fish survey work cannot occur, due to low flows.

Prairie ponds, in general, have not recharged, due to lack of snow. The fisheries in these ponds are in tough shape for the third year in a row. They are dependent on spring storms, which are very localized events. A good storm in May or June can make or break pond conditions.

Wildlife. Lack of any appreciable winter weather has resulted in minimal over-winter mortality. FWP staff will begin spring surveys in the next few weeks to determine recruitment levels. Conditions are dry

with generally spotty scattered snow being received. Spring moisture conditions will dictate effects on wildlife.

Season structures for elk, deer and antelope will allow for increased harvest opportunity should drought conditions warrant. Drought conditions will be monitored through spring and summer. If warranted, seasons will be recommended for adjustment during the August Commission meetings.

The outlook for spring turkey is good; production dipped last spring because of conditions, but there are still plenty of turkeys in the area. The region has experienced little game damage due to mild conditions.

Helena Office/Other

- Fisheries Division staff sent out the Drought-Related Fishing Closure Policy for fish manager comments. A few comments were received, which have been incorporated. Major changes are: the 8/30 automatic closure-lifting date was too early (should be 9/15); the intent of the voluntary closures has been clarified; and a "tailwater fishery" category has been added. The Policy will be sent out again to FWP fisheries staff for final review for a week. The Policy will then be posted as final on the FWP website.
- The Governor's Drought Committee meets on 3/21. The Committee is providing a Local Drought Coordinator Training session on 3/20; Kathleen is the presenter for "Non-Diversivory Uses – Drought Response Tools".
- Helena staff are updating drought-related Web postings, for both wildlife and fisheries, including the use of some broad forecast information to help people planning to travel to Montana to gauge future conditions. This mode will be used until the more detailed Internet fisheries reporting begins (June, assuming drought conditions persist).
- The draft 2001 fisheries drought impact summary was sent out for comment, with one set of comments received. Fish managers will provide their comments and the summary will be finalized within the next week.
- The special streamflow-related Future Fisheries Improvement Program grant-funding application window closes April 1st. The next normal grant cycle application deadline is July 1st.
- The next drought conference call is scheduled for April 3rd at 9:00 a.m. The next Governor's Drought Committee meeting is scheduled for April 11th.

Cc (electronic):

FWP Director, Commission Members

T. Palmer, D. Tipton - FWP, ConEd

FWP Regional Supervisors - Kalispell, Missoula, Bozeman, Great Falls, Billings, Glasgow, Miles City

Helena Fisheries Division staff

Governor's Drought Committee Staff and Website (<http://nris.state.mt.us/drought/>)



Montana Fish, Wildlife & Parks

Memo To: Interested Parties

From: Kathleen Williams

Date: April 9, 2002

Subject: April 3rd Drought Update

This update was prepared based upon drought updates submitted by fish managers and field biologists on the 4/3/02 conference call and other relevant updates and information. Wildlife information was provided from Wildlife Division staff.

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http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif. The 3/30/02 version continues to indicate "Extreme" drought in the south and south-central portions of the state, and "moderate" drought in central and southeastern Montana. The 4/2/02 version of the U.S. Drought Monitor shows much of central Montana (and parts of Wyoming) still in "Extreme" drought, with and outer band classified as "Severe" drought, and yet another outer band classified as "Moderate" drought. See <http://enso.unl.edu/monitor/monitor.html>.

The 3/1/02 mountain snowpack map is located at http://nris.state.mt.us/nrcs/Mar02/03_02swehuc.pdf. The April update, as of this writing, was not yet available, but can be accessed by accessing <http://www.mt.nrcs.usda.gov/swcs/snow/snow.html> and choosing the April "State Snowpack Map" option. These statistics do not track valley moisture. Snow-water equivalent information can be viewed in tabular form, by basin, and locations within these basins, by accessing: http://www.mt.nrcs.usda.gov/swcs/snow/past_up.html - enter the month, date, and year for yesterday, and it will generate the list. (For some reason the option for "today's info" doesn't work for me, but it might work for others.) Note that it is not advised to refer to the snowpack accumulation figures (% of normal) after April 15th, as the rate of historic meltout affects the percentage figures to the point that percentages are misleading. Use the percent of total precipitation figures after April 15th.

To compare the current and projected building of basin snowpacks, and meltout trends, to historic highs, historic lows, and long-term averages, access the snowpack trend graphs at <http://www.mt.nrcs.usda.gov/swcs/snow/trend.html> (choose the desired basin, then choose "2002"). As an example, see the Lower Yellowstone trend graph at <http://www.mt.nrcs.usda.gov/swcs/images/trend/lyell02.gif>. For a regional perspective, snowpack conditions for the western U.S. as of the first of the month are at <http://www.wcc.nrcs.usda.gov/water/snow/westsnow.pl>. Choose the month and year you're interested in.

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Forecasts of the peak flow amount and timing are usually posted under this topic at <http://www.mt.nrcs.usda.gov/swcs/forecast/forecast.html>. The information at this link, at the time of this writing, was for 2001, so check back to get updated info about flow peaking, by river. Low flow timing and amount are also posted on this site, for selected rivers in Montana (Blackfoot, Big Hole, Smith, and Dearborn).

Precipitation as percent of normal for March will be <http://www.wrh.noaa.gov/greatfalls/text/marpcntnorm.html>, as soon as it is updated. (Review the legend when accessing this graphic, as 2001 information is posted until replaced with 2002 updates. The cumulative conditions since the beginning of the water year (10/1) are posted at http://www.wrh.noaa.gov/Greatfalls/text/wateryear_percent.html. When March information is incorporated, conditions in the north-central and northwest will likely show improvement.

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Bighorn blw Bighorn Lake (-3.9)
Boulder (Yellowstone) (-3.6)
Rock/Red Lodge Creeks (-3.6)
Stillwater (-3.5)
Powder (-3.5)
Big Hole (-3.4)
Milk (-3.4)
Yellowstone blw Bighorn (-3.4)
Beaverhead (-3.3)
Jefferson (-3.3)
Little Bighorn (-3.3)
Clarks Fork (-3.1)
Birch/Dupuyer (-3.0)
Boulder (trib. to Jefferson) (-3.0)

Musselshell (-3.0)
Shields (-3.0)

Moderately Dry (rating of -2.9 to -2.0)
Little Bitterroot (-2.9)
Yellowstone abv Bighorn (-2.9)
Tongue (-2.9)
Clark Fork abv. Milltown (-2.8)
Ruby (-2.8)
Smith (-2.8)
Marias (-2.7/-2.6)
Missouri abv. Cyn. Ferry (-2.6)
Yellowstone abv Livingston (-2.6)
Gallatin (-2.5)
Missouri, Cyn. Ferry to Ft. P. (-2.4)

Dearborn near Craig (-2.4)
Stillwater/Whitefish (-2.3)
Teton (-2.2)

Sun (-2.1)
Missouri blw Ft. Peck (-2.1)

Reservoir storage conditions and projection graphs are again accessible via <http://www.gp.usbr.gov/wareprts/mtgraph0.htm>. Streamflows at USGS gauges are available through http://water.usgs.gov/cgi-bin/daily_flow?mt. Current and upcoming flow rates, in comparison to average, will be heavily affected by timing, scale and duration of snowmelt runoff.

The Montana Drought Monitoring website from 2001 has been reorganized and updated for 2002. It is located at <http://nris.state.mt.us/drought/>. Committee members and website administrators welcome and request suggestions for postings and site organization. Use the "Comments or Questions" button to send an e-mail message and/or attachment.

Region 1

Fisheries. As of April 3rd, Northwest Montana had received several more late season storms. Although the cold systems did not carry a great deal of moisture, snowmelt has been delayed and snowpacks continue to build. 4/3 Snowpacks measured 111% for the Flathead, 123% for the Kootenai, and 128% for the lower Clark Fork.

Under orders from FERC, PPL Montana recently released a drought management plan for Flathead Lake/Kerr Dam. The plan calls for a prioritized response to impending drought by reducing spring drafting, dropping Flathead lake summer levels by one (1) foot, and then reducing summer outflows downstream, in that order. PPL Montana held one public meeting in Kalispell and has another scheduled in Polson. Public interest has been high and there has been much discussion on how to balance water between Hungry Horse Reservoir, Flathead Lake, and the Flathead River downstream.

Because it is a low-elevation water basin, NRCS has predicted that Ashley Lake would not refill if spring outflows matched the Water Management Agreement(WMA). Under the agreement, outflows can be modified if the majority of water right holders agree. FWP proposed a reduced flow plan and it appears a majority will agree in an attempt to refill Ashley Lake for summer flow management.

As a side note, northwestern Montana conditions are much better than locations in Utah, where snowpacks are 45-75% of normal.

Wildlife. There has been little change in wildlife-related drought conditions since the March update, other than more moisture. The bears are all about to emerge and descend to the valley bottoms. Consequently people need to be alert and not create a situation where depredation is likely to occur. Proactive activities include bear-proofing garbage storage areas and sites where pets are fed. Easy access to such areas can result in the need to destroy bears that become accustomed to obtaining food from such sources.

Region 2

Fisheries. Relevant snow-water equivalent information relevant to the region, as of 4/3, included:

- 100 percent of avg. for Upper Clark Fork

- 105 percent of avg. for Bitterroot
- 128 percent of avg. for Lower Clark Fork

The Upper Clark Fork data is misleading because much of the snow is in the Blackfoot. Rock Creek, Little Blackfoot, Flint Creek drainages are in worse shape, relatively, in this basin.

The overall figure for the Lower Clark is also misleading, as the area below the Flathead is in better condition than upstream. The portion of the Lower Clark Fork basin in R2 is more like the Bitterroot, which is only in moderate condition.

The bottom line is a slightly improved outlook due to March precipitation, but staff will continue to watch conditions in the Upper Clark Fork.

Wildlife. With the cold and snowy weather we have had during March, the snowpack is at or slightly above normal in the region. Big game animals appear to be in good condition, but if cold weather and the delay in green-up continues, physical condition will probably begin to deteriorate, especially for pregnant females.

FWP staff plan to begin late winter/spring elk population trend and classification surveys next week. Survey initiation has been delayed due to cold weather and lack of greenup.

Region 3

Fisheries. Snow-water equivalent statistics for the region range from mid-70 to mid-80 percentiles. Flow forecasts are very gloomy, ranging from 50% to 80% of normal. Some good news is that a project with the Jefferson Watershed Council is proposing applying a ditch sealant to 22 combined miles of two diversion ditches. The project is one of the projects submitted to the special streamflow funding window of FWP's Future Fisheries Improvement grant program. Potential water savings will be assessed as part of the project.

FWP staff are also planning to start construction of a cooperatively-funded section of pipeline that will increase water delivery efficiency to Dailey Lake, reduce related flooding on a landowner's property, and require less water be diverted from Sixmile Creek than in the past.

Region 4

Fisheries. Snowpack in general in the area was still improving, as of 4/3, especially along the Rocky Mountain Front, where conditions are above average for the first time in many years. Some drainages (e.g. Smith/Judith/Musselshell) were in the 80-85% range, but that is still much better than last year.

The Missouri is also showing similar snowpack levels, also better than last year. An upcoming meeting will provide an opportunity to discuss conditions and projections in detail with the Bureau of Reclamation. We believe Canyon Ferry reservoir is expected to fill, and, hopefully, downstream flows can be increased.

The cold weather has been delaying runoff, which is good.

If Bynum doesn't get water this year, it will be dead. There is only 3-5 feet of water, but oxygen has held up with the aeration project we implemented there. Fishing closures were invoked for these waters due to public safety concerns related to ice instability from the aeration project. Regional staff are reviewing necessary updates to the closure for now and the near future. Any public information related to extension or lifting of these closures will be handled from the R2 office.

Region 5

Fisheries. There are no significant changes in snowpack or projected stream flows to report since the March update from this region. The 4/3 issue of the Billings Gazette included an article on drought conditions in south-central Montana (see <http://www.billingsgazette.com/index.php?id=1&display=rednews/2002/04/03/build/local/68-drought.inc>). Despite some recent storms, there has not been much moisture with them that would help to further build snowpack water equivalents.

As of 4/3, flows in the Bighorn have been less than 1,600 cfs for 192 consecutive days. The previous record was 141 days in 1988. We consider 1,500 cfs the absolute minimum flow necessary to merely sustain a fishery. The USBR projects that flows will remain at 1,500 cfs at least until October (another 8 months). At these flow levels, some spawning occurs in the mainstem, but young fish are forced out of the side channels and margins, and into the jaws of larger brown and rainbow trout. The lack of fish under 13 inches is very apparent in our population estimates. Low flows also mean colder water and suppressed fish growth in the Bighorn River. In addition to a noticeable lack of young fish, the numbers of older fish (age 2 and up) in the river above Bighorn Access has dropped from approximately 4,000 fish per mile in year 2000 to 2,000 fish per mile in 2001. In the lower section near Mallard's Landing, the adult fish population has dropped from about 1,400 to 1,000 fish per mile. With the young fish missing too, we expect the fishery to take several good flow years to fill in population segments that are now missing or depressed.

Throughout the region flows in the 60-80% of normal range are projected, similar to projections from March. Soil moisture deficits are high, so even snowpack figures better than last year will likely not show up in streamflows, unless also supplemented with timely rain events.

Wildlife. No significant changes since the March update.

Region 6

Fisheries. The Corps of Engineers' Ft. Peck Reservoir April 1st water level forecast predicted a lower maximum pool than in the previous (March) forecast. The Spring rise will only increase the water elevation by 1.4 feet from March through June, which is far short of reaching last spring and summer's high. This will prevent inundation of shoreline vegetation, thus we anticipate a reduction in overall forage fish production for shoreline species.

Fresno Reservoir is at 5% of full pool storage levels. The Bureau of Reclamation has begun sending a small increase (100 cfs) in flow down the canal from St. Mary's. The water should

reach Fresno in a week. Snowpack is good in the Milk/St. Mary's drainage. Mountain runoff is not occurring yet due to cold temperatures. Recent prairie snow is being rapidly absorbed into ground, resulting in no runoff to streams.

Overall, drought conditions in most Region 6 streams and rivers still look tough.

Wildlife. Current conditions are looking up in portions of Region 6. There should be enough moisture in the ground to at least start a growth of green grass and forbs. This will be good for deer, antelope and elk fawn/calf survival, and pheasant, Hungarian partridge, sharp-tailed grouse and sage grouse nesting, hatching and initial chick survival. Summer moisture will determine how good recruitment into the various populations will be.

There appears to be some run-off finally in Region 6. This should attract breeding ducks and nesting will occur. For example, sheet water is accumulating on hard pan sites in south Valley County. This has not been the case in a couple of years. This will provide places for ducks, especially pintails, to exhibit their territorial patterns of behavior and allow for the "installation" and dispersal of nests. While this sheet water will dry up by early to mid summer, there is enough run-off into permanent reservoirs to provide brood-rearing habitat.

Winter elk surveys in Region 6 will occur only in south Valley County, and are taking place now. There are no results to report at this time, but I do not anticipate any reductions in numbers. It is most likely, and potentially problematic, that numbers will show an increase over last year.

Region 7

Fisheries. Snow pack in the Bighorn Basin has increased slightly with the past couple of storms. This should help the Tongue River basin depending upon how quickly the snow comes off of the mountains and how much soaks into Wyoming soil. Overall, the water outlook for the Tongue River Reservoir still is not great. The reservoir is less than 30% of capacity (a little lower than average for this time of year), without much for anticipated re-charge.

The Tongue River Water Users Association met with their membership last month to discuss water saving measures, the addition of a second water commissioner and the use of monitoring devices on each users intake. A representative from DNRC was on hand to answer water rights and usage questions.

Pond conditions are difficult to predict. Most of the prairie snow has melted and recharge has been sporadic due to low snowpack and dry ground that absorbs the runoff as it occurs. Spring rainstorms have always been the mainstay of many of these ponds. We are working with the Miles City hatchery folks to plan rainbow trout stocking this spring. We will have to wait and see what moisture we receive before planning the bass stocks in June.

Wildlife. Up to 0.25" of precipitation (12" of snow) was received in parts of the region since last report. This moisture should improve short term soil moisture condition during green-up, but will have little effect on long-term conditions. Temperatures have remained unseasonably cold. As of 4/3, there was no evidence of green-up. During periods when

temperatures have moderated, wildlife staff have observed some creeks running, and some recharge of stock ponds which improves waterfowl pair habitats.

Helena Office/Other

- Additional comments have been received on the Drought-Related Fishing Closure Policy. Helena staff will be further reviewing the policy over the next few weeks. Equitability, risk of displacement, enforcement requirements, and what role time-of-day restrictions play in reducing potential displacement are being considered.
- Helena staff are updating the 2001 Drought Communication Plan for use in 2002. Prior to June, we will issue drought information primarily through these updates, based on conference calls and regional input. Assuming drought conditions continue, beginning in June, the Internet reporting system will be implemented where priority waters each have their own status report, available on the Web. The system will be modified to allow editing of existing information (rather than having to re-enter everything), which should solve a large concern from last year.
- The next drought conference call is tentatively scheduled for May 9th at 9 a.m. Wildlife updates should be sent to John for compiling by that date.

Cc (electronic):

FWP Director, Commission Members
T. Palmer, D. Tipton – FWP, ConEd (for distribution to regional Information Officers)
FWP Regional Supervisors – Kalispell, Missoula, Bozeman, Great Falls, Billings, Glasgow, Miles City
Helena Fisheries Division staff
FWP Fish Managers and “Drought Biologists-2002”
Governor’s Drought Committee Staff and Website (<http://nr.is.state.mt.us/drought/>)



Montana Fish, Wildlife & Parks

Memo To: Interested Parties
From: Kathleen Williams
Date: May 14, 2002
Subject: May 10th Drought Update

This update was prepared based upon drought updates submitted by fish managers and field biologists on the 5/10/02 conference call and other relevant updates and information. Wildlife information was provided from Wildlife Division staff.

General/Statewide

The long-term Palmer Drought Severity Index is calculated at a more coarse scale than in the past. See current Index status at http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif. The 5/11//02 version indicates "Extreme" drought in the north-central region of the state and in a portion of the southwest region, "Severe" drought in the central and south-central regions, and "moderate" drought in southeastern Montana. The 5/2/02 version of the U.S. Drought Monitor shows north-central Montana now in "Exceptional" drought (the worst possible), with the remainder of central Montana (and parts of Wyoming) still in "Extreme" drought, with an outer band classified as "Severe" drought, and yet another outer band classified as "Moderate" drought. See <http://www.drought.unl.edu/dm/monitor.html>. The only area of Montana not under some type of drought designation on the Monitor is the far northwest.

The 5/1/02 mountain snowpack map is located at http://nris.state.mt.us/nrcs/May02/05_02swehuc.pdf, and shows a wide variety of snowpack conditions across Montana's mountain basins. Some areas have improved snowpack conditions, while others are still below normal. These statistics do not track valley moisture. Snow-water equivalent information can be viewed in tabular form, by basin, and locations within these basins, by accessing: http://www.mt.nrcs.usda.gov/swcs/snow/past_up.html - enter the month, date, and year for yesterday, and it will generate the list. (For some reason the option for "today's info" doesn't work for me, but it might work for others.) Note that it is not advised to refer to the snowpack accumulation figures (% of normal) after April 15th, as the rate of historic meltout affects the percentage figures to the point that percentages are misleading. Use the percent of total precipitation figures after April 15th.

To compare the current and projected building of basin snowpacks, and meltout trends, to historic highs, historic lows, and long-term averages, access the snowpack trend graphs at <http://www.mt.nrcs.usda.gov/swcs/snow/trend.html> (choose the desired basin, then choose "2002"). As an example, see the Lower Yellowstone trend graph at <http://www.mt.nrcs.usda.gov/swcs/images/trend/lyell02.gif>. Note how the recent cool spring weather is

delaying meltout in many basins. For a regional perspective, snowpack conditions for the western U.S., as of the first of the month are at <http://www.wcc.nrcs.usda.gov/water/snow/westsnow.pl>. Choose the month/year you're interested in.

A "normal" snowpack may not translate to normal streamflow conditions when soil moisture is low, as a higher proportion of precipitation will be absorbed by soils and higher than normal withdrawals are likely. Areas with soil moisture deficits, and the scale of those deficits are illustrated in the "soil moisture anomaly" graphic at <http://www.cpc.ncep.noaa.gov/soilmst/img/curr.w.anom.daily.gif>. (This graphic had a bit of a glitch (lost its legend) when I last checked, but may be fixed by now.)

Streamflow forecasts, at specific stream gauge locations in Montana can be found in tabular form and graphic form options at <http://nris.state.mt.us/nrcs/sfpros2002.html>. These numbers assume NORMAL spring precipitation. The forecasts are liberal if we have a dry spring/summer on top of current snowpack trends. **"Percent of normal" streamflow volume forecasts for 2002 as of May 1st**, (assuming normal precip from here on out), by river, are as follows:

Site Name	%				
		FLATHEAD at Columbia Falls	104	MISSOURI RIVER nr Landusky	65
BADGER CREEK nr Browning	108	FLATHEAD Lake Inflow	105	MUSSELSHELL at Harlowton	56
BEAVER CREEK near Havre	15	FLINT CREEK blw Boulder Ck	71	MYSTIC LAKE Reservoir Inflow	91
BEAVERHEAD RIVER at Barretts	73	FLINT CREEK nr Southern Cross	70	NEVADA CREEK nr Finn	73
BEAVERHEAD RIVER nr Grant	68	GALLATIN RIVER at Logan	77	NF FLATHEAD nr Columbia Falls	103
BIG HOLE RIVER at Wisdom	69	GALLATIN RIVER nr Gateway	83	NF MUSSELSHELL nr Delpine	80
BIG HOLE RIVER nr Melrose	58	GIBSON Reservoir Inflow	94	POWDER RIVER at Moorehead	55
BIGHORN RIVER nr St. Xavier	56	HEBGEN Reservoir Inflow	88	POWDER RIVER near Locate	49
BITTERROOT at Missoula	91	HUNGRY HORSE Reservoir Inflow	105	PRICKLY PEAR CREEK nr Clancy	69
BITTERROOT nr Darby	88	HYALITE RESERVOIR Inflow	70	PROSPECT CREEK at Thompson Falls	98
BLACKFOOT RIVER nr Bonner	110	JEFFERSON RIVER nr Three Forks	51	ROCK CREEK nr Clinton	83
BOULDER RIVER at Big Timber	91	KOOTENAI at Leonia	102	RUBY RIVER Reservoir Inflow	54
BOULDER RIVER nr Boulder	63	LAKE SHERBURNE Inflow	103	SF MUSSELSHELL abv Martinsdale	60
CLARK FK at Whitehorse Rps	96	LIBBY RES Inflow	102	SHEEP CREEK nr White Sulphur Spgs.	66
CLARK FORK abv Milltown	80	LIMA RESERVOIR Inflow	79	SHIELDS RIVER nr Livingston	70
CLARK FORK abv Missoula	97	LITTLE BIGHORN RIVER nr Hardin	55	SKALKAHO CK nr Hamilton	100
CLARK FORK at St. Regis	95	LITTLE BLACKFOOT nr Garrison	56	SMITH RIVER abv Eagle Creek	70
CLARK FORK blw Missoula	94	LOWER WILLOW CK RES Inflow	66	ST. MARY RIVER at US/CAN Border	106
CLARK FORK nr Plains	101	MARIAS RIVER nr Shelby	113	ST. MARY RIVER nr Babb	100
CLARKS FORK RIVER nr Belfry	76	MF FLATHEAD nr West Glacier	104	STILLWATER nr Whitefish	77
COMO RESERVOIR Inflow	109	MF ROCK CREEK nr Philipsburg	85	STILLWATER RIVER nr Absarokee	75
COONEY RESERVOIR Inflow	49	MILK RIVER at East Cross	56	SWAN RIVER nr Bigfork	104
CUT BANK CREEK at Cut Bank	104	MILK RIVER at Western Crossing	67	SWIFT RESERVOIR Inflow	98
DEARBORN nr Criag	80	MISSOURI RIVER at Fort Benton	67	TETON nr Dutton	83
DUPUYER CREEK nr Valier	116	MISSOURI RIVER at Toston	63	THOMPSON nr Thompson Falls	91
ENNIS Reservoir Inflow	86	MISSOURI RIVER at Virgelle	70	TOBACCO RIVER nr Eureka	105
FISHER RIVER nr Libby	94	MISSOURI RIVER below Fort Peck	70	TONGUE RIVER RESERVOIR Inflow	83

TWO MEDICINE RIVER nr Browning	118	YELLOWSTONE at Lake Outlet	84	YELLOWSTONE RIVER nr Sidney	74
WF BITTERROOT nr Conner	88	YELLOWSTONE RIVER at Billings	80	MUSSELSHELL R NR ROUNDUP	39
WHITEFISH nr Kalispell	85	YELLOWSTONE RIVER at Corwin Spgs	87	SWIFTCURRENT CK AT MANY	103
WILLOW CREEK Reservoir Inflow	53	YELLOWSTONE RIVER at Miles City	71		
YAAK RIVER nr Troy	115	YELLOWSTONE RIVER near Livingston	87		

More detail regarding on forecasts, by basin, is at <http://www.mt.nrcs.usda.gov/swcs/forecast/bor.html>. Remember that the numbers in the tables are based on VOLUME (i.e., acre feet of flow). The 50% forecast numbers are the only ones with "% of Average" already calculated, but you should only use the 50% numbers if the forecasts for your area for the future are for "normal" precipitation. If you want to be more conservative, use the AF numbers in the 70% or 90% column and divide that by the long-term average (far right column), for the % of average applicable to drier forecasted conditions.

Forecasts of the peak flow amount and timing are usually posted under this topic at <http://www.mt.nrcs.usda.gov/swcs/forecast/forecast.html>. The information at this link, at the time of this writing, was either unavailable, or was for 2001, so check back to get updated info about flow peaking, by river. Low flow timing and amount are also posted on this site, for selected rivers in Montana (Blackfoot, Big Hole, Smith, and Dearborn).

Check in a few days at <http://www.wrh.noaa.gov/greatfalls/text/maypcntnorm.html> for precipitation as percent of normal for May. Review the legend when accessing this graphic, as 2001 information is posted until replaced with 2002 updates. The cumulative conditions since the beginning of the water year (10/1) are posted at http://www.wrh.noaa.gov/Greatfalls/text/wateryear_percent.html. When last checked, this information was current through April 2002.

Another helpful graphic is located at http://www.cpc.ncep.noaa.gov/cgi-bin/anom_realtime.sh. This graphic is on a national basis, but is updated daily and displays running 30-day (or 90-day) departure from normal precipitation statistics. From the link, choose the bottom-most entry in the column (for most recent date) in either column. The result is four graphics, with "% departure from normal precip" in the lower left. As noted in other statistics, recent precipitation events are helping, especially in the western and southern portions of the state.

The Surface Water Supply Index map for March 1st blends factors for soil moisture, precipitation, snowpack, and reservoir storage, adjusting these factors for which are most determinant at the time. As shown at http://nris.state.mt.us/Nrcs/May02/05_02swsi.jpg, the following streams are of concern:

Extremely Dry (rating of -4.0 to -3.0)

Milk (-3.8)
Boulder (Yellowstone) (-3.7)
Bighorn blw Bighorn Lake (-3.6)
Birch/Dupuyer (-3.4)
Beaverhead (-3.3)
Little Bighorn (-3.3)
Little Bitterroot (-3.2)
Powder (-3.1)
Big Hole (-3.0)
Jefferson (-3.0)

Moderately Dry (rating of -2.9 to -2.0)

Ruby (-2.8)
Musselshell (-2.8)
Shields (-2.8)
Stillwater (-2.8)
Clarks Fork (-2.8)
Yellowstone blw Bighorn (-2.8)
Tongue (-2.8)
Rock/Red Lodge Creeks (-2.5)
Clark Fork abv. Milltown (-2.3)
Boulder (trib. to Jefferson) (-2.3)
Dearborn near Craig (-2.2)
Smith (-2.1)
Yellowstone abv Bighorn (-2.1)

Because the SWSI does not account well for soil moisture in eastern Montana (note how the SWSI graphics move from basins to just the stream channel for the Missouri, Musselshell, Yellowstone, etc. in eastern Montana), it is helpful to supplement that information with soil moisture information.

Reservoir storage conditions and projection graphs are at <http://www.gp.usbr.gov/wareprts/mtgraph0.htm>. Streamflows at USGS gauges are available through http://water.usgs.gov/cgi-bin/daily_flow?mt. Current and upcoming flow rates, in comparison to average, will be heavily affected by timing, scale and duration of snowmelt runoff.

A helpful (and frequently updated) source of agricultural-related climate information and activities is the Crop Weather Report, at <http://www.nass.usda.gov/mt/>; choose "crop weather", then the report you're interested in. These are updated weekly.

The Montana Drought Monitoring website from 2001 has been reorganized and updated for 2002. It is located at <http://nris.state.mt.us/drought/>. Committee members and website administrators welcome and request suggestions for postings and site organization. Use the "Comments or Questions" button to send an e-mail message and/or attachment.

Region 1 (Kalispell)

Fisheries. Spring has been interesting in the area. The most recent storm dropped from 30-50" of snow in Glacier National Park. Only about 0.2" was documented in valley areas. Most of the snowpack is still in the mountains, so there is some chance of flooding. In late April, warm weather and rain produced some flooding in the Kootenai and Lower Clark Fork. Libby Creek was flowing at almost a 50-year flood level, causing some bank damage. With colder weather, flows have receded.

Ashley Lake came within 0.8 feet of full pool in early May, and was still rising. Summer outflows will be reset when full pool is realized. Conditions look good here.

The PPL drought plan for Flathead Lake has not yet been finalized. The draft suggests that in drought years operations would reflect the following prioritized actions: 1) minimize spring drafting, 2) allow Flathead lake levels to drop by 1 foot, then 3) reduce Lake outflows for downstream fisheries. There is some community interest in additional flows from Hungry Horse to augment Flathead Lake levels and downstream flows. The amount suggested would reduce Hungry Horse reservoir levels by 10 feet, which would be detrimental to reservoir fisheries. These concerns would figure into the decision-making process and FWP will stay involved as necessary.

Wildlife. Elk populations appear relatively similar to last year. FWP staff detected a lower calf survival through the winter but still at typical levels. Whitetail deer appear to be in good condition, with lower survival in the Yaak and higher as one approaches the Swan Valley. Mule deer populations appear stable as well. The weather has made flying difficult but biologists have achieved target sample sizes and in beyond. No drought concerns have arisen in this area as of yet.

Region 2

Fisheries. Generally improved conditions have occurred across the region over the last couple of months. Relatively speaking, the Upper Clark Fork is the driest. There are no current significant threats to the fisheries and conditions are generally much improved over last year. Dry weather in the future could cause the Upper Clark Fork to be a concern. Staff expect near-normal to normal flows throughout the region with the Upper Clark Fork with below normal flows.

Flint Creek Dam Advisory Committee approved an operation plan that should, according to a model, maintain lake levels and allow normal irrigation and submitted to Granite County Commission. The future operating regime of this facility is still unresolved.

Wildlife. With the cold weather and additional snow during March and April, snowpack for most of west-central Montana is at or just above normal. Precipitation for Missoula since January 1 is about 0.7 inches below normal. As of May 10th, FWP staff were in the middle of conducting green-up elk population trend surveys. For the most part, numbers are at previous high levels or somewhat higher. Elk cow/calf ratios remain low compared to 15 years ago; the Bitterroot ratios have shown a slight increase the last two years. Mule deer spring trend surveys are nearly complete, and fawn survival through the winter was good, with moderate to high fawn/adult ratios.

Region 3 (Bozeman)

Fisheries. Recent snow has improved conditions somewhat in some areas. Precipitation as percent of normal in the region's main basins ranges from about 85% to a high of 92% (upper Yellowstone). Water supply forecasts are lower - a range of 50% of average to about 85% of average. Higher-elevation drainages have better forecasts than valley areas.

Regarding the Yellowstone and Shields basins, drought effects are worse in small streams than in large rivers. The impact is fewer fish, especially fewer small (young) fish. Overall, an apparent two-thirds trout reduction has occurred in the Shields. Water use and conservation discussions continue through subcommittees of two watershed groups in the Shields River drainage. The Yellowstone has held up much better, but even that river is showing signs of a decrease in abundance of smaller (< 12") fish. This may have as much to do with recruitment to larger size classes, as with any effect of drought.

Regarding the Big Hole, the Drought Management Plan remains in place, with three-stage trigger flow regimes to initiate voluntary angling closures, voluntary irrigator cutbacks, and mandatory angling closures. Despite near record low annual water yields in 2000 and 2001, minimum summer flows and trout populations have fared far better than during the drought episode of the late 1980's and early 1990's.

The Ruby Task Force has defined "optimum" and "minimum" fisheries target pool levels for Ruby Reservoir, as well as an absolute minimum storage pool. While reservoir rainbow trout populations have declined from the highs of late 1990's, they are faring far better than those

observed during the late 1980's-early 1990's drought episode. The Task Force has defined a minimum flow release from the dam, which matches FWP's minimum instream flow recommendation for the lower Ruby. Releases exceeded this minimum level for overwinter flows in both 2000-2001 and 2001-2002. This year, the Task Force agreed to define "Minimum Instream Flow Guidelines" for two additional reaches of the lower Ruby. They notified water users of impending cutbacks at headgates this year. While flow mitigations have not maintained numbers of older, larger brown trout, very strong numbers of Age 3 and Age 4 fish are being maintained in the tailwater.

Regarding the Red Rock/Beaverhead system, there are no drought plans currently in place. Staff anticipate record low reservoir storage and record low streamflows within the system this year.

Wildlife. Moisture conditions in the Bozeman area continue below average. Water availability for waterfowl is favorable in Region 3, primarily because birds are highly dependent on rivers, reservoirs and spring creeks rather than upland prairie pothole areas that may be more broadly susceptible to drought.

As mentioned in earlier reports, widespread low elk calf recruitment (20s to low 30s per 100) in much of the region could well be due to the continuing drought.

The mild winter resulted in very little over-winter mortality in mule deer in most areas and fawn/doe ratios are relatively good, in the range of 40-50/100. One notable exception here is the Bridgers where we did lose some fawns over winter and the fawn/adult ratios are only in the 20s.

Sage grouse lek surveys are mostly completed, but a complete summary is not available at this time. Initial reports from approximately half of the leks surveyed indicate breeding populations have increased somewhat over last year's levels.

Region 4 (Great Falls)

Fisheries. Snowpack on the Rocky Mountain Front is fairly good. Tiber reservoir will likely fill, with 90% of normal spring and summer runoff predicted, despite early spring inflows being close to record low levels. The Sun River runoff forecast is now 95% of normal. Gibson reservoir is predicted to fill, meaning 100 cfs bypass to the Sun this summer. 50 cfs has been passed in recent dry years.

Flows below Tiber will be increased 5/10 or 5/11, but only to 500 cfs, which is only our recommended minimum fishery flow (the absolute fishery minimum is less). A spring flow level of 2,000 to 5,000 would really be beneficial, but it's not likely this year.

Bynum reservoir infill will depend on how the snowpack comes off the mountains, as diversion can only be of high flows. If meltout is sudden, Bynum may get some water. The reservoir went into winter with a maximum depth of six feet. Staff are hopeful some fish may have made it through winter, but have not yet determined if they were able to survive such difficult conditions, even with the aeration project that was installed.

Aeration was also done on Bean Lake last year. Netting here showed that rainbow trout made it through the winter, but approximately 80% of observed surviving fish are in very poor condition (e.g. blind eyes, heavy fungus, etc.). The culprit appears to be high alkalinity (sulphides at 1800 mg/l, and high bicarbonates). A model predicted high mortality at these levels even for fish that would likely be more resistant than rainbow. Supplemental inflows would help. Strains used for stocking are Eagle Lake, and Arlee; Lahontan might be more tolerant. Region 1 has had reasonable success with Eagle Lake rainbows in high alkalinity lakes.

Lake Frances is predicted to get a good amount of water, but short of the amount needed to fill. This will improve current conditions. Less information is available for Bair and Martinsdale, with the Musselshell drainage conditions not promising. Water users at Martinsdale were recently using a backhoe to try to connect the two remaining pools of water in the reservoir. DNRC required the activity to be halted. Further east, conditions are also not positive.

Staff are hopeful the Dearborn will also have a reasonable water supply. Flows in general are below normal, partially due to cold temperatures. The Smith has precipitation levels at about 90% of normal, so flows should improve when runoff begins. Winter continues in the area, with Choteau and Augusta receiving a foot of snow on 5/8. Interestingly, the average temperature for March and April in Great Falls was colder than for January and February. Late meltout should benefit late-season flows, although current streamflows are extremely low.

Lower areas are still dry; total precipitation in Great Falls is ½ of normal for the year.

Wildlife. Spring snow squalls have not appreciably added moisture to the ground. Cooler than normal temperatures, however, have delayed what otherwise might have been a disastrous start to the spring growing season. Effects upon wildlife may have been greater than anticipated, however. Spring green-up surveys for mule and white-tailed deer are uncovering significant changes to fawn survival (and thus, recruitment) in many areas. It is likely that the late March and April weather coupled with deer condition (at the lowest point in their annual energy life-cycle) may have taken a measurable toll on last years' fawns. Numbers of adult deer remain strong. Elk generally remain unaffected by drought conditions through the winter and spring months.

Although too early to predict, attendance at sharptailed grouse leks appears diminished. Poor breeding habitat conditions for each of the last two years (i.e. no residual grass cover) likely has contributed to less than stellar recruitment of young of the year. Upland bird production estimates cannot be made until mid-summer.

Region 5 (Billings)

Fisheries. Conditions in the Musselshell continue to be grim. Flows are currently 12% of normal at Harlow, and less than 1% of normal at Musselshell. Runoff hasn't begun. The Boulder is flowing 18% of normal; Stillwater 56% of normal, Rock Creek 30% of normal; Clarks Fork 52% of normal; and the Yellowstone at about 60% of normal. The streamflow forecasts for these are 75-90% of average, except the Musselshell at 40-56% of average and the Bighorn at 55% of average. Bighorn flows are being held at 1500 cfs out of Yellowtail reservoir.

There has been good media coverage regarding drought conditions; recent stories focused on the Musselshell and Bighorn drainages, respectively. FWP staff found no fish in the Musselshell from 8-13" in length. There are smaller fish (3-6") and larger ones. In 1997, brown trout longer than 9" numbered 249/mile; the figure was 216 in 1999; 250 in 2001; and 103 in 2002. There are small fish, but they may not survive to fill in behind the missing year classes. Deadman's water will reportedly be released for one cycle on the highest priority fields. Before the recent storm, it was likely no irrigation would occur from the reservoir.

Boat launching is prohibited at Big Horn Lake; predictions are that the southernmost launch might be usable by mid-May, and another by Memorial Day (with luck). Because runoff is holding off in Wyoming, it may come off suddenly, which would increase chances that it wouldn't be diverted by upstream irrigators, and some actually make it to the reservoir. The predicted maximum level is a record low, and would be 25-30 feet below normal full pool. The prohibition of boating is due to someone launching in a rivulet to the lake and not being able to get out, and the resulting significant efforts required to rescue them. All boating is prohibited.

Wildlife. Grouse breeding numbers are going to be down at least 20%, perhaps more for sharptails. Elk numbers are at record levels in several instances and do not appear to be influenced much by the drought as yet. Mule deer recruitment is a little disappointing considering the mild winter. Some of this is due to the high buck/doe ratios we had, but there appear to be fewer fawns than during the post-season counts, which is probably a reflection of the extremely dry fall leaving fawns in less than ideal condition. The moisture we received in April will make some grass but didn't improve the low water situation in reservoirs, so duck nesting potential is still low.

Region 6 (Glasgow)

Fisheries. Ft. Peck Reservoir is forecast to rise one foot through May and June to a peak elevation of 2219.9 and decline nearly 2 feet by the end of August. Production of shoreline forage fish is expected to decline.

The Middle Missouri river remains low at less than half of the 50% exceedance flow. Staff expect a fifth consecutive year of no paddlefish recruitment, due to low flows above Ft. Peck Reservoir.

Numerous prairie reservoirs remain dry and many winterkills have been observed in those with marginal water levels. Many of those that slipped through the winter will probably summerkill by late July without some significant rainfall.

Many miles of brook trout streams in the Bear Paw Mountains are fishless after last year and many more are likely to be dead by the end of this summer. Peak runoff has occurred in Beaver Creek and was 14 cfs for 2 days. Beaver Creek Reservoir is down to the permanent recreation pool level and no irrigation water will be available this year. Boat ramps are unusable. Evaporation will further reduce elevation by 3 feet this summer. FWP staff are working with Hill County and the local chapter of Walleyes Unlimited to extend ramp while levels are low.

Fresno Reservoir is at 23% of storage and irrigation will start shortly. The fishery is in dire straits. Nelson Reservoir is at 40% of storage and filling. The Nelson level may rise to 60% of capacity before irrigation demands reduce it to dead pool level.

Wildlife. There has been enough moisture this winter and spring to allow for a greenup in Region 6. This will be positive for fawning/calving big game animals, and nesting/brooding upland game birds. Conditions for waterfowl are not as good, but we did get enough run-off this spring to provide some sheet water that will stop a lot of duck pairs, especially pintails, from over-flying us. They were able to establish territories, and will likely successfully nest. The larger reservoirs picked up some water and will likely last through the summer to provide brood-rearing habitat. Winter elk surveys in HDs 630 & 631 indicated numbers are down as the result of quota levels in 2001. That is desirable; the herd needs to be further reduced. Production was good in 2001, and should be good in 2002.

We have received rain and snow off and on since May 5th. It was snowing on May 7, and an additional 6-10 inches of snow was expected over the three days. This is positive; it is early enough not to affect nesting upland game birds, as no broods are off yet. It will only improve vegetation and insect conditions for rearing upland game birds, and vegetation conditions for rearing fawns and calves. Deer surveys are not yet complete, but those that are done indicate stable and increasing mule deer populations. The moisture should allow for good fawn survival, and should allow white-tailed deer to substantially recover from the EHD die-offs.

Region 7 (Miles City)

Fisheries. Water levels remain very low in both ponds and streams in the Region. As of 5/14, the lower Yellowstone River was flowing at 6400 cfs, less than half of normal flows for this time. This is having an impact once again on paddlefishing seasons in both North Dakota and Montana. Without spring runoff, the paddlefish stage in ND and stay in specific locations making them vulnerable. The North Dakota season has been very good and they expect to have to close the season relatively soon (5/12, or, at the latest, 5/14). Low flows will undoubtedly reduce the number of paddlefish migrating to Intake in Montana.

The Tongue River remains very low as well for this time of year. Inflow to and outflow from the reservoir are 168 and 85 cfs, respectively. The Tongue is flowing 96 cfs at Miles City. Reservoir elevation remains very low and irrigators on the system are not expecting a very long season, as there is minimal storage in the reservoir. As of 5/10, the irrigators had not begun to take water, which puts their irrigation initiation about 2 weeks later than normal (cold weather has some impact on that as well).

The Powder River is also very low (about 1/4 of normal flows). Flows in this system will be very short-lived this year. Low flows in the Powder appear to have reduced use by shovelnose sturgeon and sauger for spawning. Staff expect the river will be about dry when the channel catfish are making their spawning runs.

Local ponds remain low as well. The recent storm events helped some but did not restore any of the ponds we have lost in the past two years. Staff predict about 60-70% loss on prairie pond fisheries.

Wildlife. As of early May, weather in the area continued to be unseasonably cool with some rain/snow showers. Moisture across region varies with Glendive receiving 106% of average April moisture and registering 72% of normal levels since October 1. In contrast, Miles City received 38% of normal April moisture and is at 34% of normal accumulated precipitation since October 1. Because of the cool weather and lack of moisture, green up was retarded by several weeks.

Spring deer surveys indicate what would be expected with the dry, mild winter - generally good overwinter survival with good recruitment and increased adult deer as compared to last year.

Waterfowl pair habitat is present across the region in the form of ephemeral sheet water. In areas with better moisture (Glendive, Ekalaka) stock water/reservoir resources are adequate. In other areas these water sources will most likely dry up and not be available as brood habitat

Because of the mild winter, upland bird survival was good. Cool weather seems to be delaying upland bird breeding activity. Areas with better moisture since last summer have good residual nesting cover. Drier areas, especially in the west parts of the region (Rosebud County) have fair to poor residual cover for nesting birds.

Helena Office/Other

- The Drought Fishing Closure policy was discussed with the Commission at the May meeting. Staff will request delegation of closure authority at the June meeting. Region 3 and Region 5 staff will coordinate on how the Yellowstone is listed in the "priority waters" portion of the Policy. The Internet drought reporting will cover "priority fisheries" from the Drought Closure Policy and will be ready to "go live" on June 1st.
- South Dakota filed a lawsuit against the Corps of Engineers to prohibit further drawdowns of Lake Oahe during the smelt spawn. The drawdowns were for a small amount of downstream barge traffic. The judge issued a temporary restraining order until a hearing. The Corps notified FWP that they would be taking water out of Ft. Peck to maintain water levels in Oahe. Montana then filed a suit to protect Ft. Peck water levels.
- The next drought conference call is scheduled for June 5th at 9 a.m. If important drought conditions or response actions occur between the update intervals, field staff will let Division staff know.

Cc (electronic):

FWP Director, Commission Members; T. Palmer, D. Tipton – FWP, ConEd (for distribution to regional Information Officers); FWP Regional Supervisors – Kalispell, Missoula, Bozeman, Great Falls, Billings, Glasgow, Miles City

Helena Fisheries Division staff : FWP Fish Managers and "Drought Biologists-2002"; Governor's Drought Committee Staff and Website (<http://nr.is.state.mt.us/drought/>)



Montana Fish, Wildlife & Parks

Memo To: Interested Parties

From: Kathleen Williams

Date: June 12, 2002

Subject: June 5th Drought Update

This update was prepared based upon drought updates submitted by fish managers and field biologists on the 6/5/02 conference call and other relevant updates and information. Wildlife information was provided from Wildlife Division staff. Note: This update does NOT reflect conditions affected by the storm of June 8-11, which improved moisture conditions in central and northcentral Montana, including some negative impacts to livestock, power distribution, and communication networks.

General/Statewide

The long-term Palmer Drought Severity Index is calculated at a more coarse scale than in the past. See current Index status at http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif. The 6/8/02 version indicates "Extreme" drought in the central region of the state and in a portion of the southwest region, and "Severe" drought in the southeastern Montana. The 6/4/02 version of the U.S. Drought Monitor continues to show north-central Montana now in "Exceptional" drought (the worst possible), with the remainder of central Montana (and parts of Wyoming) still in "Extreme" drought, with an outer band classified as "Severe" drought, and yet another outer band classified as "Moderate" drought. See <http://www.drought.unl.edu/dm/monitor.html>. The only area of Montana not under some type of drought designation on the Monitor is the far northwest.

Cumulative mountain precipitation information can be viewed in tabular form, by basin, and locations within these basins, by accessing: http://www.mt.nrcs.usda.gov/swcs/snow/past_up.html - enter the month, date, and year for yesterday, and it will generate the list. (For some reason the option for "today's info" doesn't work for me, but it might work for others.) Do not refer to the snowpack accumulation figures (% of normal) after April 15th, as the rate of historic meltout affects the percentage figures to the point that percentages are misleading. Use the percent of total precipitation figures after April 15th.

Normal precipitation levels may not translate to normal streamflow conditions when soil moisture is low, as a higher proportion of precipitation will be absorbed by soils and higher than normal withdrawals are likely. Areas with soil moisture deficits, and the scale of those deficits are illustrated in the "soil moisture anomaly" graphic at <http://www.cpc.ncep.noaa.gov/soilmst/img/curr.w.anom.daily.gif>. As shown, as of 6/11/02 (after the recent

large storm), soil moisture deficits were still registering in portions of central and southeastern Montana.

Streamflow forecasts, at specific stream gauge locations in Montana can be found in tabular form and graphic form options at <http://nris.state.mt.us/nrcs/sfpros2002.html>. These numbers assume NORMAL spring precipitation. The forecasts are liberal if we have a dry spring/summer on top of current snowpack trends. **“Percent of normal” streamflow volume forecasts for 2002 as of June 1st**, (assuming normal precip from then on), by river, are as follows:

Site Name	%				
BADGER CREEK nr Browning	132	HEBGEN Reservoir Inflow	78	RUBY RIVER Reservoir Inflow	78
BEAVER CREEK near Havre	14	HUNGRY HORSE Reservoir Inflow	131	SF MUSSELSHELL abv Martinsdale	56
BEAVERHEAD RIVER at Barretts	70	HYALITE RESERVOIR Inflow	65	SHEEP CREEK nr White Sulphur Spgs.	71
BEAVERHEAD RIVER nr Grant	67	JEFFERSON RIVER nr Three Forks	85	SHIELDS RIVER nr Livingston	67
BIG HOLE RIVER at Wisdom	75	KOOTENAI at Leonia	114	SKALKAHO CK nr Hamilton	100
BIG HOLE RIVER nr Melrose	82	LAKE SHERBURNE Inflow	115	SMITH RIVER abv Eagle Creek	78
BIGHORN RIVER nr St. Xavier	47	LIBBY RES Inflow	115	ST. MARY RIVER at US/CAN Border	124
BITTERROOT at Missoula	100	LIMA RESERVOIR Inflow	82	ST. MARY RIVER nr Babb	110
BITTERROOT nr Darby	98	LITTLE BIGHORN RIVER nr Hardin	42	STILLWATER nr Whitefish	114
BLACKFOOT RIVER nr Bonner	116	LITTLE BLACKFOOT nr Garrison	82	STILLWATER RIVER nr Absarokee	74
BOULDER RIVER at Big Timber	97	LOWER WILLOW CK RES Inflow	57	SWAN RIVER nr Bigfork	105
BOULDER RIVER nr Boulder	83	MARIAS RIVER nr Shelby	134	SWIFT RESERVOIR Inflow	120
CLARK FORK abv Milltown	71	MF FLATHEAD nr West Glacier	125	TETON nr Dutton	70
CLARK FORK abv Missoula	96	MF ROCK CREEK nr Philipsburg	100	THOMPSON nr Thompson Falls	107
CLARK FORK blw Missoula	98	MILK RIVER at East Cross.	71	TOBACCO RIVER nr Eureka	121
CLARKS FORK RIVER nr Belfry	76	MILK RIVER at Western Crossing	85	TONGUE RIVER RESERVOIR Inflow	43
COMO RESERVOIR Inflow	113	MISSOURI RIVER at Fort Benton	93	TWO MEDICINE RIVER nr Browning	143
COONEY RESERVOIR Inflow	32	MISSOURI RIVER at Toston	67	WF BITTERROOT nr Conner	91
CUT BANK CREEK at Cut Bank	121	MISSOURI RIVER at Virgelle	104	WHITEFISH nr Kalispell	115
DEARBORN nr Criag	84	MISSOURI RIVER below Fort Peck	104	WILLOW CREEK Reservoir Inflow	51
DUPUYER CREEK nr Valier	123	MISSOURI RIVER nr Landusky	119	YAAK RIVER nr Troy	122
ENNIS Reservoir Inflow	72	MUSSELSHELL at Harlowton	54	YELLOWSTONE at Lake Outlet	79
FISHER RIVER nr Libby	107	MYSTIC LAKE Reservoir Inflow	92	YELLOWSTONE RIVER at Billings	81
FLATHEAD at Columbia Falls	122	NEVADA CREEK nr Finn	69	YELLOWSTONE RIVER at Corwin Spgs	79
FLATHEAD Lake Inflow	121	NF FLATHEAD nr Columbia Falls	110	YELLOWSTONE RIVER at Miles City	68
FLINT CREEK blw Boulder Ck	79	NF MUSSELSHELL nr Delpine	74	YELLOWSTONE RIVER near Livingston	80
FLINT CREEK nr Southern Cross	76	POWDER RIVER at Moorehead	40	YELLOWSTONE RIVER nr Sidney	68
GALLATIN RIVER at Logan	66	POWDER RIVER near Locate	31	MUSSELSHELL R NR ROUNDUP	28
GALLATIN RIVER nr Gateway	68	PRICKLY PEAR CREEK nr Clancy	75		
GIBSON Reservoir Inflow	122	PROSPECT CREEK at Thompson Falls	142		
		ROCK CREEK nr Clinton	80		

More detail regarding forecasts, by basin, is at <http://www.mt.nrcs.usda.gov/swcs/forecast/bor.html>. Remember that the numbers in the tables are based on VOLUME (i.e., acre feet of flow). The 50% forecast numbers are the only ones with "% of Average" already calculated, but you should only use the 50% numbers if the forecasts for your area for the future are for "normal" precipitation. If you want to be more conservative, use the AF numbers in the 70% or 90% column and divide that by the long-term average (far right column), for the % of average applicable to drier forecasted conditions.

Forecast and measured peak flow amount and timing are usually posted under this topic at <http://www.mt.nrcs.usda.gov/swcs/forecast/forecast.html>. Note the two-peak pattern at many sites this year. Projected low flow timing and amount are also posted on this site, for selected rivers in Montana (Blackfoot, Big Hole, Smith, and Dearborn).

See <http://www.wrh.noaa.gov/greatfalls/text/maypcntnorm.html> for precipitation as percent of normal for May. June figures will be posted at <http://www.wrh.noaa.gov/greatfalls/text/junpcntnorm.html> when available. Review the legend when accessing this graphic, as 2001 information is posted until replaced with 2002 updates. The cumulative conditions since the beginning of the water year (10/1) are posted at http://www.wrh.noaa.gov/Greatfalls/text/wateryear_percent.html. When last checked, this information was current through May 2002. As shown, cumulative conditions for this water year were quite dry, except for northwestern Montana and a few other isolated areas.

Another helpful graphic is located at http://www.cpc.ncep.noaa.gov/cgi-bin/anom_realtime.sh. This graphic is on a national basis, but is updated daily and displays running 30-day (or 90-day) departure from normal precipitation statistics. From the link, choose the bottom-most entry in the column (for most recent date) in either column. The result is four graphics, with "% departure from normal precip" in the lower left.

The Surface Water Supply Index map for June 1st blends factors for soil moisture, precipitation, snowpack, and reservoir storage, adjusting these factors for which are most determinant at the time. As shown at http://nris.state.mt.us/Nrcs/Jun02/06_02swsi.pdf, the following streams are of concern:

Extremely Dry (rating of -4.0 to -3.0)

Milk (-3.8)
Bighorn blw Bighorn Lake (-3.6)
Beaverhead (-3.3)
Little Bighorn (-3.3)
Birch/Dupuyer (-3.2)
Rock/Red Lodge Creeks (-3.2)
Tongue (-3.2)
Powder (-3.1)

Moderately Dry (rating of -2.9 to -2.0)

Yellowstone blw Bighorn (-2.9)
Musselshell (-2.8)
Missouri River blw Cyn F (-2.7)
Stillwater (-2.7)
Clark Fork abv. Milltown (-2.4)
Boulder (Yellowstone) (-2.4)
Clarks Fork (-2.4)
Mission Valley (-2.2)

Because the SWSI does not account well for soil moisture in eastern Montana (note how the SWSI graphics move from basins to just the stream channel for the Missouri, Musselshell, Yellowstone, etc. in eastern Montana), it is helpful to supplement that information with soil moisture information.

Reservoir storage conditions and projection graphs are at <http://www.gp.usbr.gov/warepts/mtgraph0.htm>. Streamflows at USGS gauges are available through http://water.usgs.gov/cgi-bin/daily_flow?mt. Current and upcoming flow rates, in comparison to average, will be heavily affected by timing, scale and duration of snowmelt runoff and recent storm events. As of 6/11, several gauges were showing new record low flow levels for that date, including West Rosebud Creek, the Powder, Battle Creek, and the Little Bighorn.

A helpful (and frequently updated) source of agricultural-related climate information and activities is the Crop Weather Report, at <http://www.nass.usda.gov/mt/>; choose "crop weather", then the report you're interested in. These are updated weekly.

A graphic assessing current fire risk, in comparison to similar periods in 2001, can be found at <http://orbit-net.nesdis.noaa.gov/crad/sat/surf/vci/usafr.html>.

The Montana Drought Monitoring website from 2001 has been reorganized and updated for 2002. It is located at <http://nris.state.mt.us/drought/>. Committee members and website administrators welcome and request suggestions for postings and site organization. Use the "Comments or Questions" button to send an e-mail message and/or attachment.

Region 1 (Kalispell)

Fisheries. As of 6/5/02, above-average rains for May had pushed yearly precipitation totals to near normal but soil moisture was still very low. Hungry Horse Reservoir, Flathead Lake, and Lake Koocanusa were rapidly filling but many area lakes were still 3-10 feet below normal with Echo Lake one of the hardest hit. Previous heavy rain and warm temperatures pushed the North Fork Flathead, mainstem Flathead, Yaak and Fisher rivers to or above flood stage but some timely cold fronts along with one snowstorm prevented serious damage. The bankfull flows will be good for channel maintenance. Snow pack was still 47 percent above average but further flooding was not anticipated under then-current conditions.

A fish kill was reported in Van Lake. It is believed due to a bacterial infection due to stress from prolonged ice cover and low dissolved oxygen. Fish biologists will assess the mortality and determine whether a supplemental fish plant is necessary. A similar kill occurred in 1998.

Wildlife. (See information above.) In addition, wildlife staff note that as of 6/5, Smith Lake, west of Kalispell had quadrupled in size.

Region 2 (Missoula)

Fisheries. May SWSI and Streamflow Prospects information (June data was not yet available on 6/5) show Region 2 near average with the exception of the Upper Clark Fork and Little Blackfoot. The (Big) Blackfoot basin is projected to be above normal flows due to excellent snowpack in the upper watershed (Monture, North Fork Blackfoot, etc.). Rock Creek and portions of the Bitterroot are rated below average. The Bitterroot River as a whole is projected to be near average. Regular precipitation over the past couple of months has resulted in improvement of streamflow forecasts. As of 6/5, flows were approaching or at peak levels in much of the lower- to mid-elevation streams as well as in the main rivers.

Georgetown Lake is at moderate risk of going below targeted lake levels. The Advisory Committee has recommended storing as much of the snowmelt as possible. Modeling has shown that this will be effective in maintaining lake levels through the summer and fall. Post-high-flow precipitation and implementation of recommendations will be important.

Little can be done about the low flows in the Little Blackfoot River. A recently formed watershed group has not mentioned drought management planning efforts to keep water in the River, but may broach the subject. Arco has implemented a pilot program to augment flows in Warm Springs Creek. We may need to work with Arco in this area again this year.

Wildlife. Spring mule deer surveys have been completed and in general populations are stable to increasing. Fawn:adult ratios averaged 54 for the region, and ranged from 30 to 89. Much of the region received an inch or more of precipitation during the last week, and with warmer temperatures, greenup is occurring rapidly. Precipitation for Missoula through May is still about 3/4 inch below normal. No changes were recommended for moose, sheep and goat quotas based on drought conditions. A couple of hunting districts have been recommended for an increase in antlerless elk permits as a result of spring trend surveys and apparent population increases. No upland bird surveys have been conducted.

Region 3 (Bozeman)

Fisheries. Recent precipitation is helpful, but likely has not eliminated drought concerns. Some peak flows have occurred, but may come back up again near the end of the week, and with new precipitation events. Volume forecasts were for flows in 60%-80% of normal range, averaging about 70% for Upper Missouri, and 80% of the Yellowstone above Livingston.

Recent negotiations with operators of Hebgen Dam related to whether a 3,500-cfs “flushing flow” should be implemented for Hebgen at the Kirby gauge. FWP staff recommended such an event not be implemented this year, but rather the storage saved as insurance against low flows (and potential need to pulse) this summer. Recent precipitation accumulations are now being incorporated into the calculations, to determine if a flushing flow might now be advisable for this year. The 3,500 is that amount allowed to crest the Quake Lake spillway, not necessarily an amount calculated for flushing or channel maintenance. According to the FERC license, the power company must develop a flushing flow plan, with flows released on as close to a natural cycle as possible, within limitations.

As of 6/5, the Clark Canyon reservoir level is still extremely low. We continue to expect low streamflows in the Beaverhead, and the potential for resulting fishing closures, unless significant rain occurs and cool weather prevails.

Dailey Lake is 4-6 feet down (lowest level in recent history). A cooperative ditch improvement project will assist in slowing the rate of decline of the Lake level, and may reverse the decline in the next couple years.

Wildlife. (Current as of 5/23/02) We had a couple of good precipitation events in May that should help jumpstart rangeland vegetation growth. Sage grouse breeding populations were down some (16%) in the Shields area. Initial reports from the southwestern portion of the Region indicate similar grouse populations to last year (a complete report and final data analysis has not yet been compiled). Recently completed spring deer surveys detected low fawn recruitment and survival in some areas in the region (20s/100 adults in the Bridgers, Belts, Limestone Hills and the Madison). The rest of the region fared better with ratios ranging from 30 to 50 fawns per 100 adults. In much of the region, it appears that the mild winter helped fawns make it through the last few months. The region is recommending increased mule deer antlerless licenses in eleven hunting districts due to increased mule deer numbers and predation to private land in a number of areas.

Region 4 (Great Falls)

Fisheries. Conditions as of 6/5/02 were generally better than in 2001 at this time, but still below average. Canyon Ferry reservoir level is about three feet below where it peaked last year (in late June), and at least ten feet below full pool. Until recently, inflows were poor. Conditions in early June did not look positive for filling this year. Operations are being closely managed and changed based on developing conditions. Flows in the River below Holter have been predicted to only be 2,900 cfs all summer.

Prickly Pear and Dearborn drainages seem to be doing better than last year, but are not as improved as the Sun and Marias. The Smith is flowing better than last year, but still not great; 6/5 flow was slightly above 460 cfs. Tiber will likely fill, with consistent high flows in the upper Marias. Early June reservoir level is four feet below FWP's recommended level of 2990 (the Bureau prefers 2993). Last year at this time 300 cfs was being released from Tiber; this year releases are almost 550 cfs. That's less than desired for a spring pulse flow, but better than last year.

The Teton River is not doing as well as the Sun and Marias, but is better than last year. High water usually doesn't make it down the Teton, as it's captured in storage above Choteau. But at least there are flows of 40-50 cfs in the middle reach – last year flows in this reach were 20 cfs. Even at the higher levels, these flows aren't enough to attract many warm- and cool-water species out of the Missouri to use the lower Teton.

The Judith is flowing better than last year as well. Generally, conditions are better, but soil moisture is still in deficit, and precipitation levels, as of 6/5, were still behind normal. Smaller ponds and reservoirs with low water levels are showing high conductivity levels. Bean Lake was recently stocked with rainbow, and the day after stocking, there were indications of stressed fish and poor survival. Levels are down 5-6 feet, and the reservoir is only 13 feet deep. Volume is about ½ to 1/3 of full. Similar conditions were evident in a small reservoir near Lewistown. Conductivity levels could explain problems experienced in other areas. Sulphate levels were 2140 mg/l; alkalinity was 1,620; and bicarbonate was 1,320.

Gibson will likely fill (it usually does), and the question will be whether late spring and summer precipitation enables levels to be held up. Conditions may be positive for 100 cfs below Diversion in the Sun this year. Bynum Reservoir received about five feet of water, but its withdrawals are at normal levels, reservoir conditions will deteriorate to the pre-inflow condition. Recent sampling netted suckers, but no walleye or perch, but additional sampling will be conducted. Lake Frances has also received some water, but reservoirs further east are not faring as well.

Wildlife. As of 6/5, continued poor prospects existed for upland nesting birds (sharp-tailed grouse, sage grouse, pheasant, etc.) due to the lack of residual cover and severe grazing patterns owing to drought and the extreme demand for winter and spring forage for domestic livestock.

Mule deer now exhibit depressed recruitment in areas where drought has hit hardest. Fortunately, carry-over numbers of adult deer will maintain population numbers for one last

year. Cumulative and successive years of less than average production and recruitment will manifest itself this coming winter/spring unless timely spring precipitation improves forage conditions for adult, female deer. Without a substantial shot of spring and early summer moisture, these does will not produce well next year. Mountain-foothill zones seem to have fared better than these prairie and prairie-agricultural zones for mule deer populations, possibly due to more reliable and consistent moisture patterns.

Antelope surveys scheduled for late July will offer a measure of their production and survival in light of drought conditions.

Region 5 (Billings)

Fisheries. As of 6/5, flows in many drainages were higher than average, but due to late runoff, rather than promising precipitation conditions. High flows will likely be very brief. The Yellowstone and Clarks Fork were recently near flood stage. Erratic emergency bank stabilization projects were occurring even as waters were declining.

Flows in the Musselshell decline moving downstream, with flows near average at Harlow (438 cfs) and 0 at Mosby. There is limited opportunity for Deadman's to fill at this point, since they typically divert in the winter to fill this reservoir. There may be enough storage to support one cutting of hay on priority fields. Boulder and Stillwater flows were about average as of 6/5, but likely to decline quickly.

In the Bighorn, as of 6/4, 5,000 cfs was coming into the lake and 1,900 cfs being released. Although reservoir elevation is 51 feet below full pool, water level is two feet up on the boat ramp closest to Wyoming. The Park Service will investigate on 6/5 to determine if the ramp is usable (elevation 3589), and are predicting the ramp will open on 6/6 or 6/7. People are very anxious to get on the water. Ok-a-Beh is predicted to open by 6/14. The minimum to launch there is elevation 3,594. Releases are being maintained at 1,500 cfs. FWP will conduct sampling on the River the week of 6/11, despite likely severe crowding. Regional staff will issue a news release to warn anglers of the work to be done and its importance to document drought impacts to fisheries, and request cooperation and patience with related disruption.

Regional staff continue to be pulled into processes related to applications for creating or stocking private ponds, despite news that DNRC would be prioritizing drought-related applications and changes. Because FWP requires stocking permit applicants to have their "water rights in order", and many don't, these situations can require significant staff time to assist applicants and coordinate with DNRC. Staff suggest that increased efficiency could be gained by DNRC requiring more complete applications from the outset, rather than waiting for objectors to point out deficiencies. Regional staff need additional information on the data entry for the Web water-specific drought reporting.

Wildlife. Prairie grouse numbers appear to be down about 25% and pheasants are down 15%. As of 6/5, range conditions were definitely better than last year at that time; vegetation growth was still pretty short, but green. The 0.4 inch of rain the preceding weekend will help with greenup, but subsoil moisture was still almost non-existent. Mule deer recruitment is down for

the 3rd year in a row. Along the Musselshell drainage, mule deer have shifted from drier upland habitats to lower mesic sites. This could result in game damage calls later this summer if adequate rainfall doesn't occur to move deer back from irrigated crop lands. Antlerless permits have not been reduced for this reason, but if drought conditions persist permit levels may be reduced next year. Fawn recruitment levels are much better in mountain/foothill habitats than prairie habitats. Elk permits also remained unchanged. FWP distributed \$3,800 in electric bee yard materials to bee keepers in April and May to reduce potential losses that can occur with drought conditions.

Region 6 (Glasgow)

Fisheries. As of 6/5, the Milk basin was experiencing conditions similar to the Musselshell; good flows in the upper drainage, but high diversion rates. Flows are about 1400 cfs near Havre, with 8 cfs at the mouth. Soil moisture is very low in north central Montana, so precipitation is being absorbed and irrigation withdrawals are higher than normal. As of 6/5, Fresno reservoir level was at 30% of total storage, and static. We anticipate levels will rise somewhat. Nelson reservoir (offstream) was at 40% of total storage and dropping. Other small reservoirs in western and central portions of the region vary from fair shape to totally dry. In the eastern portion of the state, small reservoirs are faring better, with normal precipitation levels for the last several years.

Runoff in the Missouri is about 9,500 cfs at Landusky; about 9,000 cfs is being discharged from Ft. Peck. Forecasts are for a static water level in the reservoir through the summer. Levels are currently 2218. As of 6/5, flows in the Missouri above Ft. Peck were not likely to reach the levels needed to spur paddlefish spawning; this will be the fourth year without paddlefish reproduction. Anglers are doing well on Ft. Peck. Minnow species in the reservoir will likely be impacted by less than optimum reservoir levels. Cisco sampling is not done until September, so we don't know potential effects on this forage species at this time.

Wildlife. Some precipitation has been occurring in portions of the region. As of 6/5, prairie areas were green – positive conditions for deer mothers and fawns, and upland game bird hens and broods. Both should have a good start. If the moisture continues, survival and recruitment will be good.

Deer surveys indicate mule deer populations are stable, and white-tailed deer populations are high in some areas and increasing in others. Mule deer buck/doe ratios are well above the long-term average, and fawn recruitment into the populations from last year was good.

While standing-water conditions for waterfowl could be better, these conditions are better than last year. Many breeding pairs stopped locally, and are taking up nesting. Waterfowl production should be better than last year, especially for pintails.

If moisture continues to fall throughout June, vegetative conditions and the effects on big game and upland game birds will be good. Spring upland game bird surveys indicate sage grouse breeding populations may be down slightly, but the good greenup will help chick survival. Sage grouse should be up to last year's numbers by this fall. Sharp-tailed grouse surveys indicated average numbers in the western and central portions of the region, but high numbers in the

average numbers in the western and central portions of the region, but high numbers in the eastern portion. Pheasant numbers also appear to be high. The same greenup conditions will help sharptail and pheasant chick survival, and numbers this fall should be high. No drought adaptations of bighorn sheep, elk, or deer permits were necessary. Recommendations for B licenses for antlerless mule deer have been for increases in the western part of the region. Antelope adjustments are pending the July surveys.

Region 7 (Miles City)

Fisheries. Soil moisture is very low; adjacent states have captured much of the early runoff. As of 6/5, recent storms had helped, but results will likely be short-lived. The Powder River typically flows 300-400 cfs at this time of year; this year, upper basin flows are 159 cfs and flows at the confluence with the Yellowstone are 30 cfs. If this pattern continues, connectivity with the Yellowstone will be lost. Early sampling on the Powder indicates a very poor spawning year there, unfortunately; this is a very important spawning area for Yellowstone fish. We suspect low flows explain the low use.

Ponds in the region are dependent on where and how much rain is received. Recent storm events have been almost totally absorbed, resulting in almost no pond recharge. Rainbows have been stocked into ponds that had water. We will likely lose some, especially without timely summer precipitation events. Data indicates that drought has destroyed approximately ½ of the pond fisheries in the region, and effects continue.

The Yellowstone has received a pulse of water, which caused some paddlefish to move up to Intake. As of 6/5, the pulse (about 40,000 cfs) was moving through Miles City, and should spur additional paddlefish movement as it passes into North Dakota. Spawning will likely be low, but any contribution would be helpful after several years of no production.

About 600-800 cfs are entering Tongue River Reservoir. Irrigation began late this year, in an attempt to maximize storage in the reservoir. They started at 30,000 AF (of 80,000 capacity), with some belonging to Tribes. As of 6/4, the reservoir was about 2/3 full, with 600 going in and 300 out. Flows 100 miles down the system drop to 175 cfs; below the T&Y diversion, flows drop to 12 cfs. When the diversion was opened, high levels of fish stranding occurred in the lower river. Call letters for FWP's senior water should be sent this year. FWP staff have communicated with T&Y operators (with rights of 189 cfs, but taking 125); they are encouraging their users to be efficient with water use. They are the second most senior right, and not receiving a very high proportion of what is being released from the dam. If we make a call, they will allow that junior water to pass downstream, and may consider making a call for their senior water.

There are two commissioners on the system, where there has been no formal administration in the past, which would provide some assistance with calls. Unless some change in water use patterns occurs, the Tongue will become like the Musselshell, with extreme low flows happening on a regular basis, not just in drought years. T&Y operators have prohibited watering outside of permitted areas, which was done regularly in the past. There are some opportunities for

letters have been sent to Tongue River juniors. Flows may increase after the first cutting. After that a call may be timely. Crappie fishing is excellent at Tongue River Reservoir.

Wildlife. May showers across the region have provided some relief and allowed vegetation to green up and grow. May storms brought from 0.9"(Jordan, Broadus, Ekalaka) to 2.32" (Miles City) of precipitation to areas in southeastern Montana. October 2001 to present moisture totals have improved somewhat ranging from 45% of normal at Jordan to 75% of normal at Glendive.

Spring Mule deer surveys in southeastern Montana indicate a decline in recruitment, from 66 fawns per 100 adults in the spring of 2001 to 58 fawns per 100 adults in the spring of 2002. This decline is due in part to the effects of drought but also not totally unexpected regardless of drought conditions. The high percentage of nonbreeding fawns noted in the spring 2001 population foretold of a drop in spring 2002 recruitment. Spring 2002 total deer numbers are 10% above the long term average with large increases in numbers being noted in areas with more mesic habitats (riparian areas, wet creeks etc). As a result of drought conditions deer have shifted from drier "traditional" upland habitats to those areas where moisture and vegetation conditions are better. As the summer progresses and if drought conditions persist, the region expects crop damage complaints to increase; as "traditional" habitats dry up, deer continue to concentrate in mesic areas with crop production, especially irrigated alfalfa fields.

Helena Office/Other

- Junior water user warning letters are being issued.
- The Internet reporting system is ready for entry, and revised so that edits are possible (rather than having to re-enter all information). It would be helpful to use for angling trip planning, if that helps save time for field staff. Fish managers will provide suggestions on changes to the proposed list; at a minimum, any water that has received drought-related closures in the past few years (and included in the 2002 drought closure policy) must have information entered. GIS staff will send out instructions on the system. These updates will continue to be posted as assistance in trip planning-related requests; the reporting system will cover current conditions.
- Another copy of the fishkill reporting policy and packet will be sent to Fish Managers.
- The Division Administrator will request delegation of drought-related fishing closure authority (with concurrence from the local Commissioner) from the Commission at their June meeting.
- Additional water right-related questions are arising about people building ponds off irrigation ditches. A discussion regarding water policy will be included in the 6/25 Fish Managers meeting at Ft. Peck. Fish managers will bring examples of pond permitting questions. People are approaching the Director's office for their permits, and the situation is a mess at least in some areas. We will request some DNRC assistance with these questions.

- The next drought conference call is scheduled for July 9th at 9 a.m. If important drought conditions or response actions occur between the update intervals, field staff will let Division staff know.

Cc (electronic):

FWP Director, Commission Members

T. Palmer, D. Tipton – FWP, ConEd (for distribution to regional Information Officers)

FWP Regional Supervisors – Kalispell, Missoula, Bozeman, Great Falls, Billings, Glasgow, Miles City

Helena Fisheries Division staff

FWP Fish Managers and “Drought Biologists-2002”

FWP Wildlife Managers

Governor’s Drought Committee Staff and Website (<http://nris.state.mt.us/drought/>)



Montana Fish, Wildlife & Parks

Memo To: Interested Parties
From: Kathleen Williams
Date: July 10, 2002
Subject: July 9th Drought Update

This update was prepared based upon drought updates submitted by fish managers and field biologists on the 7/9/02 conference call and other relevant updates and information. Wildlife information was provided from Wildlife Division staff.

General/Statewide

The long-term Palmer Drought Severity Index is calculated at a more coarse scale than in the past. See current Index status at

http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif . The 7/6/02 version indicates "Extreme" drought in the central, south-central, and southeastern regions. The 7/3/02 version of the U.S. Drought Monitor no longer shows north-central Montana in "Exceptional" drought (the worst possible), but still shows the central, south-central, and southeastern portions as "Extreme" drought, with portions of the remainder of the state (and parts of Wyoming) in "Severe" drought, "Moderate" drought, or "Abnormally Dry". Drought Impact Types assigned by the Monitor can include "agricultural", "fire danger" and/or "hydrological". Our drought impact assignment is solely "hydrologic" – meaning the major impacts of drought are now being expected and seen in surface flow and water availability, not in crop damage and wildfires. See <http://www.drought.unl.edu/dm/monitor.html>.

Normal precipitation levels may not translate to normal streamflow conditions when soil moisture is low, as a higher proportion of precipitation will be absorbed by soils and higher than normal withdrawals are likely. Areas with soil moisture deficits, and the scale of those deficits are illustrated in the "soil moisture anomaly" graphic at

<http://www.cpc.ncep.noaa.gov/soilmstimg/curr.w.rank.daily.gif> . As shown, as of 7/9/02, moderate to significant soil moisture deficits are still registering in central and southern Montana.

Streamflow forecasts are no longer being computed by the NRCS for this year, but previous information for 2002 can be accessed, by basin, at <http://www.mt.nrcs.usda.gov/swcs/forecast/bor.html>. See <http://www.mt.nrcs.usda.gov/swcs/forecast/forecast.html> for projected low flow timing and amount for selected rivers in Montana (Blackfoot, Big Hole, Smith, and Dearborn).

See <http://www.wrh.noaa.gov/greatfalls/text/junpcentnorm.html> for Montana precipitation as percent of normal for June. The cumulative conditions since the beginning of the water year (10/1) are posted at http://www.wrh.noaa.gov/Greatfalls/text/wateryear_percent.html.

Another helpful graphic is located at http://www.cpc.ncep.noaa.gov/cgi-bin/anom_realtime.sh. This graphic is on a national basis, but is updated daily and displays running 30-day (or 90-day) departure from normal precipitation statistics. From the link, choose the bottom-most entry in the column (for most recent date) in either column. The result is four graphics, with "% departure from normal precip" in the lower left.

The Surface Water Supply Index map for July 1st blends factors for soil moisture, precipitation, snowpack, and reservoir storage, adjusting these factors for which are most determinant at the time. As shown at http://nr.is.state.mt.us/Nrcs/Jul02/07_02swsi.pdf, the following streams are of concern:

Extremely Dry (rating of -4.0 to -3.0)

Bighorn blw Bighorn Lake (-4.0)
Beaverhead (-3.7)
Powder (-3.7)
Little Bighorn (-3.6)
Tongue (-3.6)
Yellowstone blw Bighorn (-3.2)
Musselshell (-3.2)

Moderately Dry (rating of -2.9 to -2.0)

Rock/Red Lodge Creeks (-2.8)
Stillwater (-2.6)
Milk (-2.4)
Shields (-2.2)
Jefferson (-2.2)
Clark Fork abv. Milltown (-2.1)

Because the SWSI does not account well for soil moisture in eastern Montana (note how the SWSI graphics move from basins to just the stream channel for the Missouri, Musselshell, Yellowstone, etc. in eastern Montana), it is helpful to supplement that information with soil moisture information.

Reservoir storage conditions and projection graphs are at

<http://www.gp.usbr.gov/warepts/mtgraph0.htm>. Streamflows at USGS gauges are available through <http://waterdata.usgs.gov/mt/nwis/current?type=flow> (list of all Montana gauges with current flow) and http://water.usgs.gov/cgi-bin/daily_flow?mt (graphic showing which gauges are running low vs. high, across the state).

A helpful (and frequently updated) source of agricultural-related climate information and activities is the Crop Weather Report, at <http://www.nass.usda.gov/mt/>; choose "crop weather", then the report you're interested in. These are updated weekly.

A graphic assessing current fire risk, in comparison to similar periods in 2001, can be found at <http://orbit-net.nesdis.noaa.gov/crad/sat/surf/vci/usafr.html>.

The Montana Drought Monitoring website from 2001 has been reorganized and updated for 2002. It is located at <http://nr.is.state.mt.us/drought/>. Committee members and website administrators welcome and request suggestions for postings and site organization. Use the "Comments or Questions" button to send an e-mail message and/or attachment. Drought status in Montana, as assigned by the Committee, by county, is located at <http://nr.is.state.mt.us/drought/status/DroughtStatusMaps.html>.

Region 1 (Kalispell)

Fisheries. Conditions were quite wet, as of 7/9, with 0.8" of rain received on 7/8. Going into June the area had snowpacks in the 200-300% of normal range due to cold, wet spring and late snowfall events. Heavy runoff occurred through June, with much being twice normal levels. Flows are just starting to drop to average rates. Staff are dealing with many requests for streambank stabilization projects.

All area reservoirs are within inches of full, with some being held down slightly to accommodate any potential remaining surges in runoff. Lake Koocanusa operations moved from a spill test to an actual spill of up to 15,000 cfs. Libby, Hungry Horse and Kerr all went into flood control operation mode in late June. Nitrogen supersaturation problems occurred downstream of Libby Dam, with levels up to 124%, and most fish showing related effects. No direct mortality from the spills has occurred so far, however there were some turbine-related kills. The spill phase is complete, so gas levels should return to normal soon, though flows are still high and fish were exposed to excessive levels for 5 days. Staff will continue to monitor fishery status.

Public meetings are being held on the Flathead/Kerr draft drought plan. FWP staff have expressed concern over potential excessive drafting of Hungry Horse to sustain Flathead Lake levels while maintaining downstream fish flows. An EIS is being prepared. Drought warning letters should be sent to Young and Tobacco junior water users. Streamflow statistics that may be of interest for July 10th are listed below.

Stream/Gauge Location	Flow on 7/10/02	% of long-term median flow for 7/10
Tobacco River near Eureka ¹	462 cfs	124%
Yaak River near Troy	604 cfs	103%
North Fork Flathead near Columbia Falls	8,430 cfs	187%
Middle Fork Flathead near W. Glacier	8,220 cfs	182%
South Fork Flathead at Spotted Br.	4,010 cfs	123%
Flathead River at Columbia Falls	21,100 cfs	167%
Stillwater near Whitefish	451 cfs	105%
Whitefish River near Kalispell	486 cfs	163%
Swan River near Bigfork	2,180 cfs	117%
Clark Fork River at St. Regis	NA	NA
Clark Fork near Plains	33,700 cfs	121%

Region 2

Fisheries. No exceptional drought conditions are occurring in the region. The following is the change in percent of normal streamflow prospects between March and June, 2002. Most drainages recorded improvements except the Upper Clark Fork that remained essentially stable. Areas of concern (Upper Clark Fork tribs) improved significantly. Conditions do not justify potential fishing restrictions at this time.

	March	% of normal	June	% of normal
Bitterroot		82		100
Blackfoot		86		116
Upper Clark Fork		73		71
Middle Clark Fork		82		98

Flint Creek	55	76
Little Blackfoot	45	82
Rock Creek	57	80

For Georgetown Lake management, a federal judge dismissed the case because of no federal jurisdiction. The ruling mentioned that the jurisdiction may fall under DNRC and/or contract law. Granite County released a higher than usual amount of water this spring and may have reduced the amount of stored water for summer irrigation. A meeting on 7/11 will provide additional information. DNRC held a workshop to instruct the County on management of the reservoir. Streamflows of special interest that are gauged by the USGS are shown below.

Stream/Gauge Location	Flow on 7/10/02	% of long-term median flow for 7/10
Clark Fork at Deer Lodge	141 cfs	73%
Clark Fork near Drummond	460 cfs	72%
Clark Fork above Missoula	3,380 cfs	102%
Little Blackfoot near Garrison	135 cfs	135%
Flint Creek near Drummond	46 cfs	66%
Rock Creek near Clinton	580 cfs	79%
North Fork Blackfoot near Ovando	637 cfs	181%
Blackfoot near Bonner	2,310 cfs	115%
Bitterroot near Darby	1,060 cfs	92%
Bitterroot near Missoula	3,530 cfs	98%

Region 3 (Bozeman)

Fisheries. As of 7/9, stream flows region-wide were running 50-80 % of the long term median (with some exceptions both higher and lower). Most stream reach flows were between the 50 and 80% exceedence flows for the day. Stream water temperatures are undergoing typical daily fluctuation but so far are very acceptable at 70F or less (mostly less).

Since snowmelt is ending, we are at the mercy of the weather (and hay farmers) from this point on. Frequent thunderstorms continue to drop significant moisture on a fairly regular basis, though in a patchy distribution. The first hay cutting is underway regionally and complete in a few places.

Water storage in Lima and Clark Canyon reservoirs remains critically low. However, region-wide, we are in relatively good shape compared to where we thought we were going to be had we not had the significant precip of the last 6 or 8 weeks. Currently there are no anticipated fishing restrictions on the horizon although that could change at surprisingly short notice.

As of 7/3, the Jefferson was running about 1700 cfs, approximately 50% of the long term median. The Big Hole was supplying much of the water for the Jefferson at that time, with the Beaverhead and Ruby at low levels. At least one major canal was off over the July 4 holiday to kill vegetation. We typically see flows drop abruptly by the 10th or 15th of July when water users get back into full swing.

As of 7/3, the Missouri at Toston was at about 5,000 cfs, with 8,700 being the long-term median. Outflow at Canyon Ferry continues to be less than 3,000 cfs and the lake continues to rise.

No temperature problems have been detected in the Jefferson/Upper Missouri system, and fishing conditions are excellent.

Streamflows of special interest that are gauged by the USGS are shown below:

Stream/Gauge Location	Flow on 7/10/02	% of long-term median flow for 7/10
Beaverhead River at Barretts	445 cfs	93%
Beaverhead River nr Twin Bridges	136 cfs	55%
Ruby River above Reservoir	133 cfs	69%
Ruby River below Reservoir	275 cfs	92%
Big Hole at Wisdom	78 cfs	42%
Big Hole below Mudd Creek	453 cfs	156%
Big Hole near Melrose	910 cfs	63%
Jefferson near Twin Bridges	1,070 cfs	39%
Jefferson near Three Forks	1,070 cfs	54%
Boulder River near Boulder	78 cfs	94%
Madison below Ennis Lake	1,480 cfs	88%
Gallatin near Gallatin Gateway	954 cfs	69%
Gallatin at Logan	471 cfs	47%
Missouri at Toston	2,760 cfs	51%
Yellowstone at Corwin Springs	5,440 cfs	71%
Yellowstone nr Livingston	6,330 cfs	75%
Shields near Livingston	227 cfs	74%

Wildlife. Average to above-average precipitation during June has given a great boost to rangeland grasses. Good growing conditions will be favorable for game bird cover and for producing nutrition cover for big game. Final sage grouse lek tallies show overall male attendance in breeding grounds down slightly over 2001. Any recommendation that would affect permit levels for deer, elk, or antelope due to the drought will not be made until late July following summer surveys.

Region 4 (Great Falls)

Fisheries. Conditions are reasonable overall. The Missouri is still running 3,000 cfs or less below Holter, due to poor inflows to Canyon Ferry, which appears to almost be full. Staff will be contacting the Bureau to see when they will increase outflows. It's somewhat surprising that it filled.

The Smith is doing fairly well. The Sun River has good inflows to Gibson (1,700 cfs) and the reservoir is full. Midway down the River (Simms), however, flows are only 54 cfs. In normal years, flow should be 200 or more, with 100 being a minimum recommended flow in drought years. This seems a normal year (if not better) for the Sun. Warning letters are likely justified for juniors water users downstream of Simms. The nearby reservoirs are also full (Pishkin and Willow Creek).

The Dearborn is also doing fairly well. The inflows to Tiber reservoir are well above normal, with the reservoir potentially still in flood pool conditions. Flows below Tiber have been about 5,000 cfs for a couple weeks, which should benefit some of the late-spawning warm- and cool-water fish.

Reservoirs along the Front are in pretty good shape. Bynum got some water but the level never made it to the boat ramp. Fish made it through the low period; seining showed some perch, walleye, and spottail. Current flooded terrestrial vegetation conditions should benefit reproduction of spottail. The question for Bynum will be how much water will be removed from it, and whether that amount will put the reservoir and fishery back into the critical zone. Some have noted plans to leave more in the reservoir this year, as a reserve. If so, the fishery would go into winter in much better shape than last year.

The Musselshell has almost zero flow at Mosby, the Teton at Loma is down to 25 cfs. Whether or not these fisheries can survive will depend now on rain.

Streamflows of special interest that are gauged by the USGS are shown below:

Stream/Gauge Location	Flow on 7/10/02	% of long-term median flow for 7/10
Prickly Pear near Clancy	38 cfs	70%
Tenmile Creek nr Rimini	15 cfs	160%
Little Prickly Pear at Wolf Creek	83 cfs	115%
Dearborn nr Craig	221 cfs	104%
Smith bl Eagle Creek	186 cfs	110% ¹
Sun nr Simms	64 cfs	34%
Sun nr Vaughn	625 cfs	109%
Marias near Shelby	2,310 cfs	240%
Marias nr Chester	4,230 cfs	433%
Teton at Loma	16 cfs	52%
Musselshell nr Roundup	20 cfs	9%
Musselshell at Mosby	0 cfs	(median for date = 141cfs)
Missouri blw Holter	2,980 cfs	56%
Missouri at Ft. Benton	5,550 cfs	64%
Missouri nr Landusky	13,900 cfs	NA

¹ short period of record with several dry years

Region 5 (Billings)

Fisheries. Conditions vary across the region from reasonably good to quite poor. While western portions of the state have had some precipitation, Billings has had no precipitation in July and 1.4" in June. The country has greened up fairly well, and is now starting to dry up.

The upper Musselshell has some flow, but way below normal for this time. Deadman's Basin can hold 72,000 AF; at the end of June, volume was 12,350. Plans were to pull 40 cfs out, until volume was reduced to 9,000AF (dead pool storage), which should occur soon, if not already.

That level leaves a depth of 20 feet, which is generally sufficient for the fishery to survive. The Musselshell has no flow at Mosby.

The Yellowstone is holding up reasonably well, with an extended runoff period in June. Flows in the system are starting to drop to below-average flows (Boulder, Stillwater, Rock Creek, Clarks Fork and mainstem.) As with other rivers, summer precip will determine how they fare from here on out. Cooney Reservoir is close to full and holding up well; fishing there is good.

Those streams that are regularly dewatered, even in good flow years, include Rock Creek at Rockdale (now dry), Pryor Creek (dry downstream of I-90 bridge), etc.

The Ok-aBeh boat ramp on Yellowtail Reservoir was recently closed – it was open for only 10 days this year. The lake is in very poor condition for recreation. The only other functional ramp at this time (Barry's Landing) probably will close in 8-12 days. FWP helped the Bureau and NPS try to get the lake level to rise by agreeing to reduced outflows for a short period (from 1,500 to 1,250 for 10 days). The Bureau thought that if that occurred the lake level could be held, but inflows were just too low to accomplish this objective. In addition, a measurement of actual flows showed that what was thought to be 1,500 cfs was actually 1,310 cfs. Now flows are back to a more accurate 1,500 cfs in outflows. The Bureau has been great to work with, but Bighorn conditions this year have been extremely difficult to predict. The outflow (River flows + irrigation canal) is about 2,000 cfs, with inflows at 1,100. The Reservoir fishery is not a concern, and the River is fishing fairly well, despite relatively low numbers of fish.

Streamflows of special interest that are gauged by the USGS are shown below:

Stream/Gauge Location	Flow on 7/6/00	% of long-term median flow for 7/6
Musselshell at Harlowton	55 cfs	39%
Musselshell nr Roundup	20 cfs	9%
Boulder at Big Timber	946 cfs	66%
Stillwater nr Absarokee	1,960 cfs	77%
Clarks Fork at Edgar	1,440 cfs	62%
Rock Creek nr Red Lodge	473 cfs	91%
Red Lodge Creek bl Cooney Reservoir	83 cfs	49%
Yellowstone at Billings	9,180 cfs	63%
Bighorn ab Tullock Creek	1,080 cfs	22%

Wildlife. Billings is currently approximately 30% below average precipitation for the year. Since the 2nd week in June there has been very little precipitation, temperatures have been high with several very windy periods. This has desiccated the vegetation and we are rapidly losing the green conditions we had in early June. Abundant grasshopper populations were noted in several counties north of the Musselshell River which could benefit young birds in view of the desiccation of forbs. Antelope surveys began on 7/8; results will be available for the next report period. It appears that all game species occupying upland habitats away from riparian areas may get short shrift again this year as we enter the normal dry period of the year.

Region 6 (Glasgow)

Fisheries. As of 7/10, the Milk River was beginning to decline after several weeks of high flows. Increased discharge was of sufficient duration to allow Fresno Reservoir to temporarily attain full pool and the elevation at Nelson Reservoir to begin increasing. Recent precipitation in the western section of Region 6 has provided runoff for some drought-stricken reservoirs to recharge as well as small creeks in the Bears Paw Mountains. The eastern section of the region did not suffer from severe drought earlier and continues to get good precipitation.

Mountain runoff in the upper Missouri drainage is providing flows over 13,000 cfs above Fort Peck Reservoir resulting in over a one-foot increase in lake elevation to 2220 msl. Discharges below Ft. Peck with increased flows from the Milk River are currently providing a 10,000 cfs flow near Wolf Point.

Streamflows of special interest that are gauged by the USGS are shown below:

Stream/Gauge Location	Flow on 7/10/02	% of long-term median flow for 7/10
Musselshell at Mosby	0	(median for date = 141 cfs)
Milk nr Harlem	763 cfs	150%
Milk at Nashua	639 cfs	172%
Missouri nr. Wolf Point	9,650 cfs	113%
Missouri near Culbertson	9,900 cfs	108%
Poplar nr Poplar	62 cfs	151%
Peoples Creek bl Kuhr Coulee	0	(median for date = 7.1 cfs)

Region 7 (Miles City)

Fisheries. As of 7/1, recent rain events had really helped out on a localized basis. Many of the prairie ponds north of Miles City are full now due to large amounts of rain in a short period of time. Areas south of us are still hurting. Ponds in this region are dependant upon localized precipitation or snowmelt events for recharge. Recent years have left area ponds in tough shape. The rains of the preceding week or two will help.

As of 7/1, flows in the Tongue River were still minimal. The irrigators on the system are now using contract water (once inflows into the TRR fall below discharge they are on contract water) so the reservoir elevation will continue to decline unless we receive some rain events along the Bighorn Mountains. The river below the T&Y Diversion was only flowing 30 cfs, which is better than it has been this summer, but it appears that the flows below the diversion will remain low all summer.

As of 7/1, the Powder River was flowing at low levels and appeared to be following the same pattern as in previous drought years. If so, the river may lose connectivity with the YSR sometime in August.

Helena Fisheries Division staff
FWP Fish Managers and "Drought Biologists-2002"
FWP Wildlife Managers; Governor's Drought Committee Staff and
Website (<http://nris.state.mt.us/drought/>)



Montana Fish, Wildlife & Parks

Memo To: Interested Parties
From: Kathleen Williams
Date: August 8th, 2002
Subject: August 7th Drought Update

This update was prepared based upon drought updates submitted by fish managers and field biologists on the 8/7/02 conference call and other relevant updates and information. Wildlife information was provided from Wildlife Division staff.

General/Statewide

See http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif for the current status of the long-term Palmer Drought Severity Index. The 8/3/02 version shows Northwest Montana in "Severe" drought, northeast Montana in "Moderate" drought, and the remainder of the state in "Extreme" drought. The 8/6/02 U.S. Drought Monitor shows the band of "Extreme Drought" receding from the northern portions of the state (now assigned less severe drought categories), but lingering in central and southern Montana (and parts of Wyoming). See <http://www.drought.unl.edu/dm/monitor.html>.

Normal precipitation levels may not translate to normal streamflow conditions when soil moisture is low, as a higher proportion of precipitation will be absorbed by soils and higher than normal irrigation withdrawals are likely. Areas with soil moisture deficits, and the scale of those deficits are illustrated in the "soil moisture anomaly" graphic at <http://www.cpc.ncep.noaa.gov/soilmst/img/curr.w.anom.daily.gif>. As of 8/7/02, moderate deficits are still registering in most of Montana except the northeast (surplus) and extreme northwest (neutral).

Streamflow forecasts are no longer being computed by the NRCS for this year, but previous information for 2002 can be accessed, by basin, at <http://www.mt.nrcs.usda.gov/swcs/forecast/bor.html>. See <http://www.mt.nrcs.usda.gov/swcs/forecast/forecast.html> for projected low flow timing and amount for selected rivers in Montana (Blackfoot, Big Hole, Smith, and Dearborn).

See <http://www.wrh.noaa.gov/greatfalls/text/julpcntnorm.html> for Montana precipitation as percent of normal for the month of July. The cumulative conditions since the beginning of the water year (10/1) are posted at http://www.wrh.noaa.gov/Greatfalls/text/wateryear_percent.html. Another helpful graphic is located at http://www.cpc.ncep.noaa.gov/cgi-bin/anom_realtime.sh. This graphic is on a national basis, but is updated daily and displays running 30-day (or 90-day) departure from normal precipitation statistics. From the link, choose the bottom-most entry (for most recent date) in either column. The result is four graphics, with "% departure from normal precip" in the lower left.

The Surface Water Supply Index map for August 1st blends factors for soil moisture, precipitation, snowpack, and reservoir storage, adjusting these factors for which are most

determinant at the time. As shown at http://nris.state.mt.us/Nrcs/Aug02/08_02swsi.jpg, the following streams are of concern:

Extremely Dry (rating of -4.0 to -3.0)
Bighorn blw Bighorn Lake (-3.9)
Tongue (-3.7)
Beaverhead (-3.5)
Yellowstone blw Bighorn (-3.5)
Powder (-3.4)
Little Bighorn (-3.2)
Musselshell (-3.2)

Moderately Dry (rating of -2.9 to -2.0)
Milk (-2.7)
Stillwater (-2.6)
Jefferson (-2.3)

Because the SWSI does not account well for soil moisture in eastern Montana (note how the SWSI graphics move from basins to just the stream channel for the Missouri, Musselshell, Yellowstone, etc. in eastern Montana), it is helpful to supplement that information with soil moisture information.

Reservoir storage conditions and projection graphs for Bureau of Reclamation reservoirs are at <http://www.gp.usbr.gov/wareprrts/mtgraph0.htm>. Streamflows at USGS gauges are available through <http://waterdata.usgs.gov/mt/nwis/current?type=flow> (list of all Montana gauges with current flow) and http://water.usgs.gov/cgi-bin/daily_flow?mt (graphic showing which gauges are running low vs. high, across the state).

A helpful (and frequently updated) source of agricultural-related climate information and activities is the Crop Weather Report, at <http://www.nass.usda.gov/mt/>; choose "crop weather", then the report you're interested in. These are updated weekly.

A graphic for current fire risk can be found at <http://orbit-net.nesdis.noaa.gov/crad/sat/surf/vci/usafr.html>. See <http://www.fs.fed.us/r1/fire/nrcc/weather/7day/7day.htm> for the Weekly Fire Weather/Fire Danger Outlook. A map of current large fires in Montana is at http://www.fs.fed.us/r1/fire/nrcc/large_west.jpg (for western Montana) and http://www.fs.fed.us/r1/fire/nrcc/large_east.jpg (for eastern Montana).

The Montana Drought Monitoring website from 2001 has been reorganized and updated for 2002. It is located at <http://nris.state.mt.us/drought/>. Committee members and website administrators welcome and request suggestions for postings and site organization. Use the "Comments or Questions" button to send an e-mail message and/or attachment. Drought status in Montana, as assigned by the Committee, by county, is located at <http://nris.state.mt.us/drought/status/DroughtStatusMaps.html>.

Region 1 (Kalispell)

Fisheries. If there's any problem in the region, it's too much water. Late, heavy precipitation in the Kootenai basin forced 11 days' spill over Libby Dam. Biologists are still evaluating the impact on the fisheries. Since the spill, the Corps has been maintaining high flows, both to create room in the reservoir and to augment flows downstream for salmon. Kootenai residents are starting to complain that flows at 2.5 – 3 times normal are affecting recreation opportunities and damaging to riverfront properties.

Flows are running twice normal levels in the Flathead River downstream of Hungry Horse. Operators are moving water downstream for salmon flows. The BIA has weighed in on the Flathead drought plan. They held two scoping meetings in preparation of an EIS. Most public comment was in favor of drafting Hungry Horse to maintain Flathead Lake levels and downstream fish flows. That is a change from the previous Plan direction, and one that we are concerned about and have commented upon, due to potential impacts to cutthroat and bull trout in Hungry Horse.

Most other streamflows in the region are at, or slightly above, normal. A fairly heavy rainstorm came through on 8/6, and there have been some other storms already this month. Flows are holding up fairly well. Streamflow statistics that may be of interest for July 10th are listed below.

Stream/Gauge Location	Flow on 8/7/02	% of long-term median flow for 8/7
Tobacco River near Eureka ¹	152 cfs	112%
Yaak River near Troy	178 cfs	81%
North Fork Flathead near Columbia Falls	2,210 cfs	123%
Middle Fork Flathead near W. Glacier	1,920 cfs	124%
South Fork Flathead above Twin Creek	936 cfs	104%
South Fork Flathead near Columbia Falls	6,060 cfs	426%
Flathead River at Columbia Falls	21,100 cfs	194%
Stillwater near Whitefish	210 cfs	109%
Whitefish River near Kalispell	128 cfs	112%
Swan River near Bigfork	703 cfs	92%
Clark Fork River at St. Regis	3,890 cfs	116%
Clark Fork near Plains	14,600 cfs	120%

Wildlife. Despite recent rains, conditions are very windy, and that is drying things out. However, we still are in much better shape than the last three summers. Conditions for wildlife in the middle to high elevations look very good. The lower elevations are where things are beginning to look dry, which is fairly typical of August. No unusual impacts to wildlife are predicted. In fact, animals have better summer forage quality this year, so they should be in good condition this fall.

Region 2

Fisheries. The problem here is either too much or too little water. July SWSI's ranged from "moderately dry" on the (upper) Clark Fork to "slightly wet" in the Blackfoot; other areas were near average for the index. Stream flows across the Region are about 10% above normal, due to recent rains. Flows are 100% of normal in the Blackfoot (improved from 90% a week ago). The Bitterroot is 88% of normal, and affected by irrigation. Painted Rocks releases (about 100 cfs) started on August 1st. Rain has been heavy in the Bitterroot, with roads washing out, making the river turbid and unfishable.

The Clark Fork above Milltown is flowing 103% of normal; below Milltown, flows are at about 115% of normal, partially due to initiation of drawdowns at Milltown. When the reservoir starts

to fill again, flows below the dam will likely be 70% of normal, which should be acceptable. The drawdown is for data collection to refine cost estimates for potential sediment removal.

Areas of concern in the past have been Rock Creek and the Little Blackfoot. Rock Creek has improved from recent rains (from 85% of normal to 100%). The Little Blackfoot showed a similar improvement.

Streamflows of special interest that are gauged by the USGS are shown below.

Stream/Gauge Location	Flow on 8/7/02	% of long-term median flow for 8/7
Clark Fork at Deer Lodge	81 cfs	114%
Clark Fork near Drummond	292 cfs	81%
Clark Fork above Missoula	1,710 cfs	110%
Little Blackfoot near Garrison	77 cfs	113%
Flint Creek near Drummond	62 cfs	188%
Rock Creek near Clinton	339 cfs	94%
North Fork Blackfoot near Ovando	278 cfs	140%
Blackfoot near Bonner	924 cfs	96%
Bitterroot near Darby	520 cfs	121%
Bitterroot near Missoula	1,020 cfs	100%

Wildlife. Annual precipitation for Missoula was normal through early August. Frequent afternoon thunderstorms and showers are keeping vegetative conditions relatively moist. At this time we see no need to make any changes in opening dates for early hunting seasons such as archery, moose, sheep and goat and upland birds. We are recommending no changes in final deer and elk permits based on drought conditions. All of the region's Wildlife Management Areas are open with no restrictions based on fire hazards.

Region 3 (Bozeman)

Fisheries. Moisture has been well-below normal in most every drainage. The recent cold fronts didn't provide much moisture, but slowed the rapid decline of flows in the area's major rivers. Currently, the only desperate situation is the Red Rock River. Lima reservoir is empty and flows are dropping to 5-7 cfs upstream of Dell, where poor water quality (high temperatures and irrigation return flows) exists. Below Dell, spring influences and irrigator conservation are keeping fish alive. A voluntary angling restriction (to all angling) is in place for the Red Rock between Lima Dam and Clark Canyon Reservoir.

Clark Canyon Reservoir is at record low storage (18,000 AF). Operators plan to release water for about 14 more days for irrigators. Field staff predict storage will fall to 10,000 AF by the end of the irrigation season. Significant reservoir fishery losses have occurred even at minimum pools of 40,000AF; the severity of impacts with a pool $\frac{1}{4}$ the past observed minimum is unknown. This sets up the Beaverhead for a post-irrigation flow of possibly less than 35 cfs in the upper Beaverhead "blue ribbon" reach. Staff may recommend fall spawning closures again for brown trout in this area.

Moving east, conditions improve. The Ruby, like the Madison, Gallatin and Yellowstone, has benefited from cooler weather. Water temperature conditions are holding up and flows are

reasonable. Ruby Reservoir storage is 20,000AF, far above what was predicted if previous drought conditions had continued unabated. Recent rains and conservative dam operations have helped. Current flows are 70% of the long-term median flow.

Flows are holding up on the Big Hole. No flows have dropped below trigger values for angling closures. Flow on 7/6 were 59 cfs near Jackson, with 29 of that going down the Spokane Ditch. Another 4 cfs in flow was provided from the Spokane Ditch, thereby keeping flows just above the closure trigger for the upper reach at the Wisdom gauge. Temperatures have been spiking up, but nighttime temperatures are cold, creating moderate temperature conditions overall. If the cool weather and rain do not persist, closure triggers could be reached in late August.

Record heat in July resulted in some observed mortality of whitefish and suckers in the middle Big Hole reach, but the middle and lower reaches are now doing well and are not near the drought plan triggers for action or closure.

The Madison is being managed very well. Flows have been maintained near long-term median flows at Kirby. Fishing conditions are great. Peak temperatures rose to about 68F in the hot period in July, but have moderated considerably – most are below 65F – which is unusual for this time of year, and under continued drought conditions. PPL Montana is continuing to pulse flows in the lower Madison, even though temperatures are peaking below 70F. Fishing in the lower Madison should be the best in a decade, just due to favorable water temperatures.

The Jefferson is currently holding up well, despite a decline a few days ago to 400 cfs. It's now about 530 (long-term median is 872; drought trigger for closure is 200). At 400 cfs, some of the communication and conservation strategies of the drought plan are triggered. It is likely more extreme measures will be needed soon, as flows will likely decline.

Gallatin flows, even with near-normal snowpack, are declining rapidly. At Gallatin Gateway, the River is severely dewatered from irrigation withdrawals. Flows in the undiverted reach are also plummeting. The water commissioner is reportedly providing water only to rights senior to 1872, so many irrigators are going without. The cooler weather is providing great benefits here. Flows are still above the 80% exceedence values on the Gallatin and likely on the East Gallatin as well. Water temperatures peaked in the low 70sF early on, and have moderated to high 60s, which is excellent for this time of year.

The Yellowstone is below the long-term median flows, but solidly above the 80% exceedence, and peak temperatures have only reached 68F in the last several weeks. We are skating by on some good monsoonal moisture.

Detailed information on the Shields is unavailable, but it is holding up better than expected. Temperatures are moderating everywhere. There is high probability that flows will drop considerably more, but for now things are holding up. Streamflows of special interest that are gauged by the USGS are shown below (see next page).

Stream/Gauge Location	Flow on 8/7/02	% of long-term median flow for 8/7
Beaverhead River at Barretts	456 cfs	100%
Beaverhead River nr Twin Bridges	118 cfs	92%
Ruby River above Reservoir	80 cfs	66%
Ruby River below Reservoir	264 cfs	68%
Big Hole at Wisdom	28 cfs	64%
Big Hole below Mudd Creek	160 cfs	99%
Big Hole near Melrose	287 cfs	56%
Jefferson near Twin Bridges	474 cfs	59%
Jefferson near Three Forks	285 cfs	42%
Boulder River near Boulder	24 cfs	102%
Madison below Ennis Lake	1,130 cfs	74%
Gallatin near Gallatin Gateway	488 cfs	79%
Gallatin at Logan	292 cfs	69%
Missouri at Toston	1,440 cfs	64%
Yellowstone at Corwin Springs	2,690 cfs	77%
Yellowstone nr Livingston	3,390 cfs	78%
Shields near Livingston	85 cfs	89%

Wildlife. While moisture levels in Bozeman were about half of normal for July, there has been enough rain in the mountains to maintain vegetation in better shape than the last couple of years. Summer calf/cow ratios in the Gallatin, Madison and Gravelly Mountain ranges are in the low range (25-35 calves per 100 cows) for this time of the year, more than likely related to previous years drought conditions. On the other hand, antelope reproduction is up this year. At this point, we are not planning any changes to the scheduled 2002 hunting season based on weather conditions.

Region 4 (Great Falls)

Fisheries. In general, conditions are reasonable. More flow in the upper Missouri would help. Canyon Ferry reservoir level is 6-7 feet above the level achieved last year, and we are waiting for a corresponding increase in outflows. Inflows are likely poor enough that operators are being very conservative. Flow below Holter, therefore, has stayed the same (about 3,000 cfs), though flows were supposed to increase to 3,500 at the end of July.

The Smith is doing better than last year. Water temperatures increased in mid-July to 80-82F for three consecutive days, which is close to fishkill conditions. There were some scattered dead fish; some appeared to be hooking mortalities, with no broad fishkill evident. Cooler weather in the last week has really helped. Maximum water temperatures have been in the range of 68 – 74F.

In general, most rivers in the region are doing better than last year. The Sun River at Simms (middle reach) was a concern. In the last two weeks, flows declined to 40-60 cfs, but have recently increased to 120 cfs. Gibson reservoir levels are dropping rapidly (not unusual). The Teton is doing a little better in the middle section, but there is no flow at Loma (also not unusual). The Tiber/Marias system is doing unbelievably well. Tiber is still 96% full. Last year at this time, there was about 100 cfs coming into Tiber; at this time, about 600 is coming in. The Marias below Tiber was 300 cfs at this time last year, and is now 1,100.

Bynum Reservoir (receives water from the Teton system) is also doing better than last year. We understand the irrigators plan to leave 20,000 AF in the reservoir as a reserve for next year (total capacity is 72,000), which will help over-winter fish survival. Recent netting showed that some fish (including walleye and perch) have survived, though maximum depth last year was only 6 feet. The aeration may have been the deciding factor. Lake Frances is about full, too.

Conditions deteriorate to the east. The lower Musselshell has no flow. The Judith fell below 100 cfs, but has recently rebounded somewhat. In general, weather is really helping, given that these two weeks are typically the hottest of the year. We're "dodging a bullet." Streamflows of special interest that are gauged by the USGS are shown below:

Stream/Gauge Location	Flow on 8/7/02	% of long-term median flow for 8/7
Prickly Pear near Clancy	17 cfs	62%
Tenmile Creek nr Rimini	0.78 cfs	74%
Little Prickly Pear at Wolf Creek	46 cfs	100%
Dearborn nr Craig	88 cfs	131%
Smith bl Eagle Creek	79 cfs	66% ¹
Sun nr Simms	133 cfs	114%
Sun nr Vaughn	760 cfs	134%
Marias near Shelby	626 cfs	165%
Marias nr Chester	1,110 cfs	137%
Teton at Loma	0 cfs	Same
Musselshell nr Roundup	2.6 cfs	1.4%
Musselshell at Mosby	0 cfs	(median for date=53)
Missouri blw Holter	3,080 cfs	77%
Missouri at Ft. Benton	4,570 cfs	91%
Missouri nr Landusky	5,620 cfs	89%

¹ short period of record with several dry years

Wildlife. June and July rains have kept grass green through much of the Region. However, moisture came too late and at exactly the wrong time to enhance upland bird production. The region's upland bird forecast is not promising for 2002. Cumulative drought had left little nesting cover and probably impacted insect populations. Vegetation production this year certainly will enhance bird production in 2003, especially for those species heavily dependent on residual vegetation.

Antelope winter survival has been very good and mid-summer surveys reflect strong presence of adult animals. Fawn production and survival looks very good grading to the east, except the north end of the Rocky Mountain Front where severe rain and snow fell in June. A near total loss of young (antelope and bighorn sheep) has been documented in that impacted area.

Elk appear minimally impacted by continuing drought. In some instances, they have shifted distribution, resulting in summer depredation complaints. Spring deer surveys revealed strong adult winter survival and only moderate to poor fawn production. Summer survival is not a problem. Recent moisture sets the stage for much improved production next year.

Region 5 (Billings)

Fisheries. Since the beginning of the water year (October 1), the area has received 59% of normal precipitation, and July was the third warmest on record. After the mid-July hot spell, temperatures moderated, and cool weather is forecast for the next few days. Flows aren't as low in most rivers as they were last year.

There have been no releases from Deadman's Basin since the end of July; irrigators only received about 25% of their contract water. Last year they received 50%, and that was considered the worst year since the reservoir was built (1930s). Storage is about 14% of capacity, and 20% of average. Anglers are finding creative ways to launch there, but current details of fishing success are not known.

The Yellowstone is flowing 2/3 of the median level; last year's flows at this time (1,100 cfs) were much worse. Water temperatures are about 72F. Regional staff thought about recommending voluntary closures during the July hot spell, but concerns have moderated with the cool weather. The Boulder is flowing about 71% of median and water temperatures are about 61F. The Stillwater is about 78% of normal.

The big problem in the region is the Bighorn drainage. Flows out of Yellowtail remain about 1,500 cfs, or about ½ of the median flow for this time. The Little Bighorn, flowing at about 1% of normal, continually at record low flows, is not helping. The largest upstream reservoir, Boysen, is close to empty. Prospects are grim for next year. Launching at Yellowtail has been prohibited since July 6th at Barry's Landing. Storage is at 64% of average and 48% of capacity. Only with the maximum projected inflows could the reservoir fill next year. Cooney is at 100% of average, and is experiencing heavy use.

If cool weather continues, area fisheries might make it, as flows are all between 60-80% of normal – much better than last year. Streamflows of special interest that are gauged by the USGS are shown below:

Stream/Gauge Location	Flow on 7/6/00	% of long-term median flow for 7/6
Musselshell at Harlowton	34 cfs	45%
Musselshell nr Roundup	2.6 cfs	1.4%
Boulder at Big Timber	178 cfs	68%
Stillwater nr Absarokee	763 cfs	76%
Clarks Fork at Edgar	385 cfs	60%
Rock Creek nr Red Lodge	224 cfs	80%
Red Lodge Creek bl Cooney Reservoir	154 cfs	114%
Yellowstone at Billings	3,600 cfs	62%
Bighorn near St. Xavier	1,550 cfs	58%
Bighorn ab Tullock Creek	1,570 cfs	59%

Wildlife. South central Montana continues to run anywhere from 30-50% below the annual precipitation level for the year to date. The Beartooth Face is one exception where there has been fairly good moisture. Upland bird conditions are "spotty." Pheasants along riparian areas will continue to be one bright spot. Antelope numbers are quite high, but no game damage

reports have been received to date. We are starting to get reports of bee yard depredation by black bears in foothill prairie situations, which can be aggravated by dry conditions.

Region 6 (Glasgow)

Fisheries. The moisture in north-central Montana is benefiting the Milk River. Flows at the Canadian border were above-normal, but declined significantly by Nashua. Reservoirs on the Milk are receding. Fresno is 61% of capacity; Nelson (one of the better walleye fisheries) is down to 23% of capacity. Gillnetting at Fresno is scheduled to begin soon, which will provide additional information regarding the condition of the trout fishery there.

The Missouri River is below normal above Ft. Peck. Ft. Peck reservoir levels are dropping, and will continue to drop another couple of feet through the summer. This should not affect access from ramps; lower levels occurred in the early 90s and late 80s. We don't anticipate a major problem for the fishery at this point, but lower levels may set the stage for potential problems next spring. Without considerable snow in the mountains, forage fish would suffer, due to lack of a rising pool in spring and the subsequent lack of inundation of shoreline vegetation.

We know there was some paddlefish reproduction that occurred above Ft. Peck, but we don't yet know the level of reproduction that occurred.

The Beaver Creek and Bear Paw area is doing very well. Bear Paw reservoir is at 100% capacity; Beaver Creek Reservoir is somewhat less, but still in good shape. Recent rains revived trout streams in the area. Private ponds are holding fairly well. Moderating temperatures have really helped, as have recent thunderstorms. Streamflows of special interest that are gauged by the USGS are shown below:

Stream/Gauge Location	Flow on 8/7/02	% of long-term median flow for 8/7 (median for date=53)
Musselshell at Mosby	0	
Milk nr Harlem	797 cfs	167%
Milk at Nashua	74 cfs	44%
Missouri nr. Wolf Point	9,360 cfs	99%
Missouri near Culbertson	9,530 cfs	100%
Poplar nr Poplar	28 cfs	165%
Peoples Creek bl Kuhr Coulee	0	(median for date=0.12)

Wildlife. Things are still green in Region 6. We are above average for total July precipitation. People are starting to report seeing upland game bird broods, especially sage grouse. Deer production appears to be good. The only drought-related negative impact noted is poor antelope fawn survival in the central part of the region. This is related to a dry fall, causing antelope to enter winter (which was mild) in poor condition resulting in a reduction in fawn birth and survival.

Region 7 (Miles City)

Fisheries. Streamflows of special interest that are gauged by the USGS are shown below:

Stream/Gauge Location	Flow on 8/7/02	% of long-term median flow for 8/7
Yellowstone at Forsyth	6,380 cfs	75%
Yellowstone at Miles City	7,530 cfs	84%
Yellowstone nr Sidney	4,160 cfs	44%
Tongue River at State Line	75 cfs	45%
Tongue at Tongue River Dam (TRD)	167 cfs	44%
Tongue at Miles City	27 cfs	17%
Powder at Moorhead	34 cfs	37%
Powder nr Locate	NA cfs	NA

Wildlife. Moisture received from April 1 to August 3 varied across the region from 85% of normal at Glendive, Jordan and Broadus to 55% of normal at Ekalaka and Hysham. Areas with higher moisture still have abundant green vegetation. Even though moisture is short, vegetation conditions, curing and dry, in southeastern Montana are what one would expect for the 1st week of August. Temperatures have been moderate with no temperatures over the mid 90's.

Antelope surveys generally show numbers 5-10% below those recorded last year and from 20% above to 10% below the long-term average. Areas with better moisture show better numbers of antelope. Antelope production has rebounded this year averaging 73 fawns:100 does and ranging from 60-87 fawns per 100 does. Last year's production averaged 55 fawns:100 does.

Upland bird broods are now becoming apparent and upland birds appear to have had a fairly successful nesting season. Insects, important for growth of young upland birds are generally abundant. Stock water resources and small ponds used by waterfowl have all but disappeared except in areas where timely summer storms have replenished water.

Helena Office/Other

- Division and Regional staff agreed that the following protocol would be followed for issuing voluntary fishing restrictions:
 - 1) Field staff inform Regional Supervisor and local Commission member of recommendation.
 - 2) Notify Helena Fish Division (Ken McDonald or Chris Hunter). Please notify Kathleen Williams, too, in case calls for FWP's senior water should accompany the recommendation and public information.
 - 3) Coordinate news release announcing voluntary closure with Helena Con Ed (can be prepared by Regional information staff, but ensure release is issued statewide)
 - 4) Update Internet site with recommended restrictions

For mandatory restrictions, the Director and local Commission member must approve, so these restrictions must be coordinated through the Helena office.
- Junior water user warning letters have been issued on streams with SWSIs in any "dry" range, and will continue to be sent where otherwise justified. We are trying to improve our database of junior water users, which is proving difficult. There are reaches where flows are below FWP's instream water right. The Director has approved the process for making calls; the Smith will likely be first. There are other streams where the amount of junior rights could make a difference in flows, and these will be prioritized and reviewed for calls. Big Spring Creek will be included in the review, as well as the Bighorn.

- The next drought conference call is scheduled for August 19th at 1 p.m.

Cc (electronic):

FWP Director, Commission Members

T. Palmer, D. Tipton – FWP, ConEd (for distribution to regional Information Officers)

FWP Regional Supervisors – Kalispell, Missoula, Bozeman, Great Falls, Billings, Glasgow, Miles City

Helena Fisheries Division staff

FWP Fish Managers and “Drought Biologists-2002”

FWP Wildlife Managers; Governor’s Drought Committee Staff and

Website (<http://nris.state.mt.us/drought/>)



Montana Fish, Wildlife & Parks

Memo To: Interested Parties
From: Kathleen Williams
Date: August 20th, 2002
Subject: August 19th Drought Update

This update was prepared based upon drought updates submitted by fish managers and field biologists on the 8/19/02 conference call and other relevant updates and information.

General/Statewide

See http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif for the current status of the long-term Palmer Drought Severity Index. The 8/17/02 version shows Northwest Montana in "Severe" drought, northeast Montana with no drought designation, and the remainder of the state in "Extreme" drought. The 8/13 U.S. Drought Monitor shows the band of "Extreme Drought" receding from the northern portions of the state (now assigned less severe drought categories), but lingering in central and southern Montana (and parts of Wyoming). See <http://www.drought.unl.edu/dm/monitor.html>.

Normal precipitation levels may not translate to normal streamflow conditions when soil moisture is low, as a higher proportion of precipitation will be absorbed by soils and higher than normal irrigation withdrawals are likely. Areas with soil moisture deficits, and the scale of those deficits are illustrated in the "soil moisture anomaly" graphic at <http://www.cpc.ncep.noaa.gov/soilmstimg/curr.w.rank.daily.gif>. As of 8/19/02, moderate deficits are registering in southern and portions of northwestern Montana, and surplus conditions are noted for the northeast.

Streamflow forecasts are no longer being computed by the NRCS for this year, but previous information for 2002 can be accessed, by basin, at <http://www.mt.nrcs.usda.gov/swcs/forecast/bor.html>. See <http://www.mt.nrcs.usda.gov/swcs/forecast/forecast.html> for projected low flow timing and amount for selected rivers in Montana (Blackfoot, Big Hole, Smith, and Dearborn).

See <http://www.wrh.noaa.gov/greatfalls/text/julpcntnorm.html> for Montana precipitation as percent of normal for the month of July. The cumulative conditions since the beginning of the water year (10/1) are posted at http://www.wrh.noaa.gov/Greatfalls/text/wateryear_percent.html. Another helpful graphic is located at http://www.cpc.ncep.noaa.gov/cgi-bin/anom_realtime.sh. This graphic is on a national basis, but is updated daily and displays running 30-day (or 90-day) departure from normal precipitation statistics. From the link, choose the bottom-most entry (for most recent date) in either column. The result is four graphics, with "% departure from normal precip" in the lower left.

The Surface Water Supply Index map for August 1st blends factors for soil moisture, precipitation, snowpack, and reservoir storage, adjusting these factors for which are most

determinant at the time. As shown for the SWSI as of August 1st (at http://nris.state.mt.us/Nrcs/Aug02/08_02swsi.jpg), the following streams continue to be of concern:

Extremely Dry (rating of -4.0 to -3.0)
Bighorn blw Bighorn Lake (-3.9)
Tongue (-3.7)
Beaverhead (-3.5)
Yellowstone blw Bighorn (-3.5)
Powder (-3.4)
Little Bighorn (-3.2)
Musselshell (-3.2)

Moderately Dry (rating of -2.9 to -2.0)
Milk (-2.7)
Stillwater (-2.6)
Jefferson (-2.3)

Because the SWSI does not account well for soil moisture in eastern Montana (note how the SWSI graphics move from basins to just the stream channel for the Missouri, Musselshell, Yellowstone, etc. in eastern Montana), it is helpful to supplement that information with soil moisture information.

Reservoir storage conditions and projection graphs for Bureau of Reclamation reservoirs are at <http://www.gp.usbr.gov/warepts/mtgraph0.htm>. Streamflows at USGS gauges are available through <http://waterdata.usgs.gov/mt/nwis/current?type=flow> (list of all Montana gauges and recent flow levels) and http://water.usgs.gov/cgi-bin/daily_flow?mt (graphic showing which gauges are running low vs. high, across the state). As of 8/20, the Little Bighorn and Powder Rivers had set new record lows for the date.

A helpful (and frequently updated) source of agricultural-related climate information and activities is the Crop Weather Report, at <http://www.nass.usda.gov/mt/>; choose "crop weather", then the report you're interested in. These are updated weekly.

A graphic for current fire risk can be found at <http://orbit-net.nesdis.noaa.gov/crad/sat/surf/vci/usafr.html>. See <http://www.fs.fed.us/r1/fire/nrcc/weather/7day/7day.htm> for the Weekly Fire Weather/Fire Danger Outlook. A map of current large fires in Montana is at http://www.fs.fed.us/r1/fire/nrcc/large_west.jpg (for western Montana) and http://www.fs.fed.us/r1/fire/nrcc/large_east.jpg (for eastern Montana).

The Montana Drought Monitoring website from 2001 has been reorganized and updated for 2002. It is located at <http://nris.state.mt.us/drought/>. Committee members and website administrators welcome and request suggestions for postings and site organization. Use the "Comments or Questions" button to send an e-mail message and/or attachment. Drought status in Montana, as assigned by the Committee, by county, is located at <http://nris.state.mt.us/drought/status/DroughtStatusMaps.html>.

The U.S. Seasonal Drought Outlook, as of 8/15/02, shows drought conditions expected to persist through November 2002 across most of central and all of southern Montana, with only "spotty relief". Although ongoing drought is expected in the extreme southeastern portion of the state, the Outlook predicts "some improvement" in this area. See http://www.cpc.ncep.noaa.gov/products/expert_assessment/seasonal_drought.html.

Region 1 (Kalispell)

Conditions have not changed much in the Region since the last update. The last two weeks have been cooler, with some precip (but windy), so things are drying out. Fire danger is climbing and a dry lightning storm recently produced 14 small fires. River flows are generally average or a little below average. Cold nights have kept water temperatures at reasonable levels.

Flathead Lake is near full. Hungry Horse and Libby reservoirs are down 8-10 feet, as scheduled. There is a fish kill in Vermillion Bay of Noxon Rapids Reservoir, involving hundreds of whitefish and a few other species. The cause is unknown but pathology samples have been taken. Fish from Lake Mary Ronan and Lower Thompson Lake are showing signs of bacterial or parasitic infestations (reddened patches). This is fairly common for late summer and is usually a secondary infection due to some stress from warmer water and low dissolved oxygen.

Flows in the Tobacco, where FWP holds instream water rights, area getting fairly low. Streamflow statistics that may be of interest are listed below.

Stream/Gauge Location	Flow on 8/19/02	% of long-term median flow for 8/19
Tobacco River near Eureka ¹	90 cfs	75%
Yaak River near Troy	129 cfs	72%
North Fork Flathead near Columbia Falls	1,600 cfs	114%
Middle Fork Flathead near W. Glacier	1,270 cfs	109%
South Fork Flathead above Twin Creek	614 cfs	91%
South Fork Flathead near Columbia Falls	5,990 cfs	532%
Flathead River at Columbia Falls	8,690 cfs	210%
Stillwater near Whitefish	164 cfs	98%
Whitefish River near Kalispell	103 cfs	104%
Swan River near Bigfork	533 cfs	85%
Clark Fork River at St. Regis	2,860 cfs	96%
Clark Fork near Plains	12,000 cfs	126%

Region 2

Conditions are good in the region. As reported in the last update, conditions range from slightly dry to slightly wet, with most near average. Streamflows range from 80% - 95% of normal. Air temperatures have been cool. Painted Rocks water is still being used to supplement Bitterroot flows.

Streamflows of special interest that are gauged by the USGS are shown below.

Stream/Gauge Location	Flow on 8/19/02	% of long-term median flow for 8/19
Clark Fork at Deer Lodge	79 cfs	87%
Clark Fork near Drummond	223 cfs	67%
Clark Fork above Missoula	1,230 cfs	91%
Little Blackfoot near Garrison	46 cfs	92%
Flint Creek at Southern Cross	25 cfs	83%

Flint Creek near Drummond	26 cfs	88%
Rock Creek near Clinton	235 cfs	80%
North Fork Blackfoot near Ovando ¹	235 cfs	131%
Blackfoot near Bonner	715 cfs	90%
Bitterroot near Darby	510 cfs	143%
Bitterroot near Missoula	663 cfs	71%

¹ Short period of record, dominated by dry years

Region 3 (Bozeman)

A full fishing closure has been recommended for Big Hole, the upper-most reach only, per the triggers specified in the Big Hole Drought Plan. The closure would take effect August 20th and remain in effect until flows reach or exceed 40 cfs at the Wisdom gauge for 7 consecutive days. The closure area is from the North Fork, upstream, to Rock Creek ONLY, 19 miles that typically receive low fishing use. The middle reach (monitored at the Mudd Creek gauge) is showing declining flows (100 to 130 cfs range with strong diurnal flow fluctuations). The closure trigger for this reach is 60 cfs. Regular monsoonal showers could avoid closure of this reach entirely. The lower reach (North Fork downstream to Dickie Bridge) is experiencing rapidly declining flows since the most recent substantial set of monsoonal showers. Flow readings at the Melrose gauge dropped below 200 cfs on 8/18. Fishing closure under the drought plan occurs at 150 cfs). As with the Middle Reach, well timed monsoonal showers (predicted for 8/19 through the morning of the 20th) could avoid closure entirely. Continued warm and dry would almost certainly result in closure.

The upper Ruby river is not receiving showers; flows are generally around 80-85 cfs. Releases to the lower river have been managed conservatively so far. DNRC staff have called for the meeting referenced in the agreement, to occur either late this week or early next, as reservoir storage declines to about 7,000 acre feet.

Flows in the Red Rock River continue at extremely low levels. Some flow is being provided via landowner efforts from the Dell vicinity downstream. Flows between Lima and Dell virtually cease, or limp along in the 1 to 5 cfs range. A voluntary angling restriction (all hours) is in effect, with associated landowner cooperation.

Flows in the Beaverhead are “pathetic”. Storage in Clark Canyon is at about 13,000 acre feet, heading for about 10,000 minimum pool. Prior record low storage levels were 29,900 AF last year and 39,500 in 1990. Major losses in reservoir fish populations are expected. Releases into the Beaverhead are expected to decline to match inflows (averaging about 150 cfs lately) after the 10,000 AF pool is reached. After Labor Day, minimum overwinter flows are expected to be set, reportedly at 25 cfs, to gain an additional 5,000 acre feet of storage over the next 8 months. In the past, FWP has requested at least 35 cfs for minimum drought condition flows. Losses in the brown trout stream fisheries have already been substantial after one year of 35-cfs overwinter flows. A fall fishing closure is likely for the upper Beaverhead.

Jefferson River flow at the Twin Bridges gauge recently fell to 280 cfs. The Drought Plan directs the evaluation of the need for a mandatory fishing closure when flows fall to 250 cfs. Staff are checking into projected irrigation demands, potential Ruby contributions, and other

aspects to help assess future flow patterns. The need for a closure will likely be determined by the end of the week.

The upper Yellowstone is flowing about twice the level of last year at this time; water temperatures are reasonable. Fishing is excellent. The Shields is flowing at its typical low levels, but cool temperatures have really helped out. Streamflows of special interest that are gauged by the USGS are shown below.

Stream/Gauge Location	Flow on 8/19/02	% of long-term median flow for 8/19
Beaverhead River at Barretts	323 cfs	87%
Beaverhead River nr Twin Bridges	80 cfs	43%
Ruby River above Reservoir	85 cfs	80%
Ruby River below Reservoir	281 cfs	77%
Big Hole at Wisdom	12 cfs	39%
Big Hole below Mudd Creek	120 cfs	126%
Big Hole near Melrose	209 cfs	55%
Jefferson near Twin Bridges	299 cfs	39%
Jefferson near Three Forks	227 cfs	32%
Boulder River near Boulder	20 cfs	95%
Madison below Ennis Lake	1,130 cfs	73%
Gallatin near Gallatin Gateway	415 cfs	76%
Gallatin at Logan	277 cfs	62%
Missouri at Toston	1,260 cfs	50%
Yellowstone at Corwin Springs	2,100 cfs	75%
Yellowstone nr Livingston	2,440 cfs	72%
Shields near Livingston	75 cfs	72%

Region 4 (Great Falls)

Conditions are pretty good. 1.75" of rain were recently received in Great Falls. Cool air temperatures are also helping. The Smith is flowing at about 80% of the 5-year median; water temperatures are only about 71F. Other flows vary from 191% (Marias near Shelby) to 40% of normal (Teton). Overall, flows are considerably better than last year at this time, but most are at or below average.

The reservoirs along the Front are going into the winter in much better condition than last year, meaning better potential winter survival potential. Streamflows of special interest that are gauged by the USGS are shown below:

Stream/Gauge Location	Flow on 8/19/02	% of long-term median flow for 8/19
Prickly Pear near Clancy	15 cfs	64%
Tenmile Creek nr Rimini	1.2 cfs	114%
Little Prickly Pear at Wolf Creek	41 cfs	101%
Dearborn nr Craig	57 cfs	106%
Smith bl Eagle Creek ¹	75 cfs	82% ¹
Sun nr Simms	112 cfs	77%
Sun nr Vaughn	612 cfs	113%
Marias near Shelby	573 cfs	191%

Marias nr Chester	1,030 cfs	128%
Teton at Loma	12 cfs	75%
Musselshell nr Roundup	0.57 cfs	0.3%
Musselshell at Mosby	0 cfs	(median for date=60)
Missouri blw Holter	3,300 cfs	78%
Missouri at Ft. Benton	4,950 cfs	107%
Missouri nr Landusky	5,020 cfs	81%

¹ short period of record with several dry years

Region 5 (Billings)

Since the August 7 report, flows have changed little in the Musselshell River. Water temperatures at Harlowton have dropped 11 F to around 57 F, with several cool days in the forecast.

Yellowstone River flows are half of median, but double last year's flows. The water temperature on August 15 was 65 F. The Boulder and Stillwater rivers are at 65% and 72% of median flows, respectively. Both are at about 1.5 times last year's flows and cooler (59 F). The Clarks Fork is flowing about 40% of its median flow, but Rock Creek jumped to 96% of median with irrigation water released from Glacier Lake.

The Bighorn Drainage remains in sad shape. The river is flowing at 56% of median, with the Little Bighorn now contributing about 11% of its normal flows. Bighorn Lake continues to drop, with only 1,078 cfs flowing in and 2,043 cfs flowing out. The latest projection from the US Bureau of Reclamation has next year's most probable fill at around 3,622 ft, or 18 ft below normal full pool, with the river locked in at 1,500 cfs indefinitely.

If the present flows and cool temperatures continue, fishing closures will not be requested. Streamflows of special interest that are gauged by the USGS are shown below:

Stream/Gauge Location	Flow on 7/6/00	% of long-term median flow for 7/6
Musselshell at Harlowton	24 cfs	47%
Musselshell nr Roundup	0.57 cfs	0.3%
Boulder at Big Timber	111 cfs	65%
Stillwater nr Absarokee	511 cfs	68%
Clarks Fork at Edgar	193 cfs	44%
Rock Creek nr Red Lodge	202 cfs	86%
Red Lodge Creek bl Cooney Reservoir	195 cfs	128%
Yellowstone at Billings	2,260 cfs	52%
Bighorn near St. Xavier	1,480 cfs	61%
Bighorn ab Tullock Creek	1,610 cfs	65%

Region 6 (Glasgow)

The Missouri River above Ft. Peck is flowing slightly below normal. Releases from Ft. Peck are 9,000 cfs, so the reservoir level is gradually dropping. Current elevation is 2219, not much change since the last conference call.

Good flows are entering the Milk from Glacier NP. Flows are above normal at about 540 cfs. Flows increase substantially from Fresno and Nelson reservoirs to bring flows at the mouth to 1,100 cfs. Fresno is at about 40% of the active conservation pool; Nelson is at about 52%. Last week, Battle Creek in the Chinook area received significant amounts of rain, with Dry Fork reservoir (which was empty earlier this year, resulting in a total fish kill) filling again. Additional stocking has now been requested for the reservoir.

Streamflows of special interest that are gauged by the USGS are shown below:

Stream/Gauge Location	Flow on 8/19/02	% of long-term median flow for 8/19 (median for date=60)
Musselshell at Mosby	0	
Milk nr Harlem	117 cfs	148%
Milk at Nashua	1,170 cfs	547%
Missouri nr. Wolf Point	10,000 cfs	101%
Missouri near Culbertson	10,700 cfs	111%
Poplar nr Poplar	30 cfs	200%
Peoples Creek bl Kuhr Coulee	0.47 cfs	553%

Region 7 (Miles City)

Conditions are still of concern in the region. The Yellowstone River is likely the highlight, but is still below average, flowing at least twice last year's level at this time.

Inflows to the Tongue are about 60 cfs. Irrigators are likely close to completion of irrigation. There is some discussion of purchasing tribal water again. Staff netted the reservoir, and water elevations aren't too bad, considering the severity of the drought. Whether that level can be maintained will be determined by how much more irrigation is attempted from the storage. There's likely 5,000 additional AF that could be removed. Hopefully fall precipitation will help raise elevations in advance of the stresses of winter. Fish are in fair shape, especially compared to post-winter conditions this year. They've grown in length and girth. Despite water commissioners being active on the Tongue, withdrawals may be higher than allocations.

The Yellowstone is significantly depleted between Sydney and Miles City. The Powder is not connected to the Yellowstone – the 3rd year in a row for this condition. Storms have significant and immediate effects in the system. Two more weeks will likely mean improved conditions here.

Small reservoirs in the region have fared ok this year. Small pond conditions vary by area – good to the north (storms helped recharge ponds in the Jordan-Ft. Peck areas). Ponds in the Ekalaka to Forsyth area are not faring as well.

Streamflows of special interest that are gauged by the USGS are shown below:

Stream/Gauge Location	Flow on 8/19/02	% of long-term median flow for 8/19
Yellowstone at Forsyth	4,710 cfs	74%
Yellowstone at Miles City	5,590 cfs	86%
Yellowstone nr Sidney	2,870 cfs	38%
Tongue River at State Line	57 cfs	43%
Tongue at Tongue River Dam (TRD)	159 cfs	42%
Tongue at Miles City	13 cfs	<9%
Powder at Moorhead	22 cfs	30%
Powder nr Locate	0.72 cfs	<1%

Helena Office/Other

- August 15th was the date before which closures were automatic for priority streams; now closure upon hitting the triggers is based upon regional evaluation.
- The next drought conference call is scheduled for September 3rd at 9 a.m.

Cc (electronic):

FWP Director, Commission Members
T. Palmer, D. Tipton – FWP, ConEd (for distribution to regional Information Officers)
FWP Regional Supervisors – Kalispell, Missoula, Bozeman, Great Falls, Billings, Glasgow, Miles City
Helena Fisheries Division staff
FWP Fish Managers and “Drought Biologists-2002”
FWP Wildlife Managers; Governor’s Drought Committee Staff and
Website (<http://nris.state.mt.us/drought/>)



Montana Fish, Wildlife & Parks

Memo To: Interested Parties
From: Kathleen Williams
Date: September 3, 2002
Subject: September 3rd Drought Update

This update was prepared based upon drought updates submitted by fish managers on the 9/3/02 conference call and other relevant updates and information. Due to the increased frequency of these updates, it focuses only on conditions by region.

Region 1 (Kalispell)

No update.

Region 2

Conditions are good in the region. As reported in the last update, conditions range from slightly dry to slightly wet, with most near average. Streamflows range from 85% - 95% of normal. Though flows are dropping, water temperatures are declining, too. Staff do not anticipate any problems. Painted Rocks water is still being used to supplement Bitterroot flows; the target at Darby is 400 cfs, and flows are 460.

Region 3 (Bozeman)

Conditions are not as positive as in Region 2. Flows are averaging 50-80% of normal, with dry conditions concentrated in the Beaverhead/Centennial drainages.

Jefferson River flows have improved to 546 cfs at Twin and 471 cfs at Three Forks. FWP staff had two meetings with water users in the past 10 days to discuss flows, but do not plan to continue these meetings due to improved conditions.

The region has proposed a drought-related reservoir fishing regulation change for Clark Canyon for this summer. The reservoir is expected to decline to 900 surface acres (from a maximum of 5,000). The storage will be 10,000-12,000AF; lower than the previous record low, which was 30,000 AF last year. The Commission will consider the proposed regulation at their September meeting. The change will be to 2 ling and 2 trout as limits. The brown trout are wild and stressed, and the rainbow are an important egg source. The special regulation, as proposed, will begin upon Commission approval and expire at the beginning of the next general fishing season (May, 2003).

The Upper Yellowstone has fished well all summer, and continues to do so.

Cooler temperatures in August helped to keep upland meadows green in much of the region's mountainous areas. Antelope populations were up some with fair to good fawn recruitment in many areas. Elk calf recruitment, however, continues to be low in much of the region. While overall moisture conditions are below average, early spring rains and normal, to cooler than normal, temperatures were more favorable for vegetative growth this year than in the last several years. No adjustments were made to big game quota levels based on drought conditions.

Region 4 (Great Falls)

Conditions are pretty good. Great Falls reportedly experienced the second coolest August in history, which helps with water temperatures and likely reduces irrigation demand, too. Almost three inches of rain fell in Great Falls in August, too, which is also unusual and beneficial. A local rancher noted that the last time he recalled green countryside at the end of August was 1993.

Flows are about average in region streams, except for the Smith, which is a bit below average. There is even water flowing at the mouth of the Teton. The Sun has varied over the summer; coordination seems to now be better than at the beginning of the summer. There is still 1,000 cfs flowing from Tiber, which is unbelievable, considering conditions over the last couple years there. The Missouri below Holter has risen to 3,800 cfs, and water temperatures are good. Staff recommend FWP not pursue any calls for fall water in the upper Missouri, unless weather conditions change drastically.

Region 5 (Billings)

Conditions have been very dry in the region this year. Billings has experienced only 60% of normal precipitation since the first of the year (approximately 6.5 inches). In the last month, the high country has received some good precipitation events, which has helped sustain downstream flows. Even the upper Musselshell is running 59 cfs at Harlow (though 0 at Mosby).

The Yellowstone, Boulder, Stillwater are all lower than normal, but are hanging in pretty well. Water temperatures are in the mid-50sF, and even colder at Rock Creek.

The Bighorn drainage is in sad shape. Upstream, Wyoming, reservoirs are low; Buffalo Bill is at 63% of capacity, Boysen is at 33% of capacity. As noted, minimum flows on the Bighorn (1,500 cfs) will be maintained for the foreseeable future. There are fewer fish, but the ones remaining are large and in good condition.

Region 6 (Glasgow)

No report.

Region 7 (Miles City)

There has been little change in R-7 since the last update. The Powder River drainage received a good rain event this past week, resulting in increased flows in the system for about three days. It

was just enough water to make the Yellowstone River turbid and shut off the fall sauger bite that was just beginning. There is a little flow in the Powder system and some connectivity with the Yellowstone at this time.

The Tongue River is still low; very low below the T&Y Diversion. Inflows to the reservoir are 100 cfs, with releases at the dam at 90 cfs, dropping to 20 cfs at Miles City. A few T&Y irrigators will likely irrigate until the end of September, continuing to capture all of the river at their diversion. The little flow occurring below the diversion results from return flow. This is not a good situation for the fishery and similar to the past two summers. The irrigators upstream have ceased irrigating, as they have used up all their contract storage in the dam. The dam is now being operated to match outflows to inflows. If operators follow last year's pattern, they will continue to operate this way until the inflows pick up in October when Wyoming irrigators cease diverting, and then they will continue to release minimal flows (75-100 cfs) and try to capture all they can in the reservoir for carryover storage.

The Yellowstone at Miles City is at 4,300 cfs, about 3,000 below average flows for this time of year. Staff have been doing fall electrofishing, but have struggled this past week with low flows and extensive exposed gravel bars. We may end up waiting until irrigators shut down (which typically increases flows by 1,000-2,000 cfs) to complete the second round of sampling. Flows at the Sidney gage show 3,500 cfs, about half of average. Overall, on the lower Yellowstone, we are in better shape than last year at this same time – still low, but not at emergency levels.

Pond conditions haven't changed much. Localized storms are helping with some of the ponds but field staff are reporting that most ponds dependent on surface flow are in tough shape. We have lost or severely impacted about 70-80% of our pond systems. Most all of the small (under 3 acres) ponds are dead. Some good news, however, is that some ponds have been low for so many years now that they have lots of vegetation on the shorelines; once they fill again they will be very productive and should rebound quickly and grow some nice fish. We're keeping our fingers crossed for lots of prairie snowmelt this year and resulting full ponds.

Helena Office/Other

- The date of the next drought conference call will be determined based on discussion with the Division Administrator.

Cc (electronic):

T. Palmer, D. Tipton – FWP, ConEd (for distribution to regional Information Officers)

Helena Fisheries Division staff

FWP Fish Managers and "Drought Biologists-2002"

FWP Wildlife Managers; Governor's Drought Committee Staff and

Website (<http://nris.state.mt.us/drought/>)



Montana Fish, Wildlife & Parks

Memo To: Interested Parties
From: Kathleen Williams
Date: September 19, 2002
Subject: September 17th Drought Update

This update was prepared based upon drought updates submitted by fish managers and other relevant updates and information.

General/Statewide

The long-term Palmer Drought Severity Index is calculated at coarser scale than in years past. See current Index status at

http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif. The 9/14/02 version indicates "Extreme" drought in the north-central, central, south-central, southwest, and southeastern regions, and "Moderate" drought in the northwestern portion of Montana. The 9/12/02 version of the U.S. Drought Monitor shows problematic drought conditions continuing in Montana, but the severity zone decreasing and receding to the south. All but the extreme northwest and extreme northeast portions of the state, however, remain under some type of drought ranking. See <http://www.drought.unl.edu/dm/monitor.html>.

Normal precipitation levels may not translate to normal streamflow conditions when soil moisture is low, as a higher proportion of precipitation will be absorbed by soils and higher than normal withdrawals are likely. Areas with soil moisture deficits, and the scale of those deficits are illustrated in the "soil moisture anomaly" graphic at

<http://www.cpc.ncep.noaa.gov/soilmst/img/curr.w.rank.daily.gif>. As of 9/16, southern Montana was still showing fairly significant soil moisture deficits, with a problematic pocket near what appears to be the Jefferson drainage. Northeastern Montana is registering soil moisture surpluses.

See <http://www.wrh.noaa.gov/greatfalls/text/julpcntnorm.html> for Montana precipitation as percent of normal for July. The monthly graphic for August is not yet available. The cumulative conditions since the beginning of the water year (10/1) are posted at http://www.wrh.noaa.gov/Greatfalls/text/wateryear_percent.html. Note the wet pocket over Helena and slightly to the northeast.

Another helpful graphic is located at http://www.cpc.ncep.noaa.gov/cgi-bin/anom_realtime.sh. This graphic is on a national basis, but is updated daily and displays running 30-day (or 90-day) departure from normal precipitation statistics. From the link, choose the bottom-most entry in the column (for most recent date) in either column. The result is four graphics, with "% departure from normal precip" in the lower left. Montana has been faring relatively well, compared to neighbors to the west and southwest.

The Surface Water Supply Index map for September 1st blends factors for soil moisture, precipitation, snowpack, and reservoir storage, adjusting these factors for which are most determinant at the time. As shown at http://nris.state.mt.us/Nrcs/sept02/9_02swsi.jpg, the following streams are of concern:

Extremely Dry (rating of -4.0 to -3.0)

Bighorn blw Bighorn Lake (-3.9)
Tongue (-3.7)
Little Bighorn (-3.6)
Yellowstone blw Bighorn (-3.6)
Beaverhead (-3.3)
Musselshell (-3.2)
Powder (-3.2)

Smith (-2.7)

Stillwater (Yellowstone) (-2.7)
Shields (-2.6)
Clark Fork abv. Milltown (-2.4)
Yellowstone above Livingston (-2.4)
Boulder (Yellowstone) (-2.4)
Yellowstone above Bighorn (-2.4)
Gallatin (-2.2)
Milk (-2.2)
Missouri below Ft. Peck (-2.0)
Clarks Fork Yellowstone (-2.0)

Moderately Dry (rating of -2.9 to -2.0)

Jefferson (-2.7)

Because the SWSI does not account well for soil moisture in eastern Montana (note how the SWSI graphics move from basins to just the stream channel for the Missouri, Musselshell, Yellowstone, etc. in eastern Montana), it is helpful to supplement that information with soil moisture information.

Reservoir storage conditions and projection graphs are at

<http://www.gp.usbr.gov/warepts/mtgraph0.htm>. Streamflows at USGS gauges are available through <http://waterdata.usgs.gov/mt/nwis/current?type=flow> (list of all Montana gauges with current flow) and http://water.usgs.gov/cgi-bin/daily_flow?mt (graphic showing which gauges are running low vs. high, across the state). On 9/17, flows hit new record lows for that date on the Little Bighorn, Musselshell, and Beaverhead rivers.

A helpful (and frequently updated) source of agricultural-related climate information and activities is the Crop Weather Report, at <http://www.nass.usda.gov/mt/>; choose “crop weather”, then the report you’re interested in. These are updated weekly. See <http://iwin.nws.noaa.gov/iwin/mt/state.html> for the five-day zonal weather forecast by the National Weather Service.

A graphic assessing current fire risk is at <http://orbit-net.nesdis.noaa.gov/crad/sat/surf/vci/usafr.html>. See

<http://www.fs.fed.us/r1/fire/nrcc/weather/7day/7day.htm> for the Weekly Fire Weather/Fire Danger Outlook. An August 19th map (http://www.fs.fed.us/r1/fire/nrcc/large_west.jpg) showed large fires in Montana at the time.

Will drought conditions continue in Montana? The U.S. Seasonal Drought Outlook, as of 8/29/02, shows drought conditions expected to persist or intensify through November 2002 across much of central and southern Montana, with only “spotty relief”. Although ongoing drought is expected in the far southeastern portion of the state, the Outlook predicts “some improvement” in this area. See

http://www.cpc.ncep.noaa.gov/products/expert_assessment/seasonal_drought.html. See also http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.html for

graphics showing that, as of August 15th, Montana is predicted to have above-normal temperatures through fall and winter 02/03. Precipitation is forecast to be below normal through May of 2003. This is indicative of a weak to moderate El Nino oscillation event rebuilding in the Pacific. For Montana, El Nino usually means an open winter in valleys, reduced snow levels at low mountain elevations, but can also mean a relatively good snowpack in high elevations. More information about El Nino conditions and progress is located at <http://www.noaanews.noaa.gov/stories/s938.htm>.

Region 1 (Kalispell)

Early September was hot and dry, but weather has turned cool and rainy over the last few days. Several heavy rains brought precipitation above the monthly normal. Streamflows bumped up 5 to 10 percent in response to the rain, particularly in the Kootenai drainage. The Tobacco River showed a good flow increase. Irrigation is slowing as haying wraps up. Hungry Horse Reservoir and Lake Koocanusa are both down about 20 feet due to summer flow releases for downstream uses. Flathead Lake is still essentially full but fall drafting should start soon. Streamflows of special interest that are gauged by the USGS are shown below.

Stream/Gauge Location	Flow on 9/17/02	% of long-term median flow for 9/17
Tobacco River near Eureka ¹	86 cfs	81%
Yaak River near Troy	110 cfs	81%
North Fork Flathead near Columbia Falls	1,180 cfs	115%
Middle Fork Flathead near W. Glacier	759 cfs	99%
South Fork Flathead above Twin Creek	399 cfs	89%
South Fork Flathead near Columbia Falls	3,970 cfs	443%
Flathead River at Columbia Falls	5,860 cfs	175%
Stillwater near Whitefish	123 cfs	98%
Whitefish River near Kalispell	73 cfs	93%
Swan River near Bigfork	412 cfs	85%
Clark Fork River at St. Regis	2,650 cfs	89%
Clark Fork near Plains	9,110 cfs	95%

Region 2

Conditions are generally the same in the Region as reported in the last two updates - flows range from slightly below normal to slightly above normal in area rivers and streams. Water supply in reservoirs has generally been sufficient. Water temperatures are cooling because of longer nights and generally cooler days. Streamflows of special interest that are gauged by the USGS are shown below.

Stream/Gauge Location	Flow on 9/17/02	% of long-term median flow for 9/17
Clark Fork at Deer Lodge	97 cfs	63%
Clark Fork near Drummond	275 cfs	61%
Clark Fork above Missoula	1,110 cfs	79%
Little Blackfoot near Garrison	37 cfs	73%
Flint Creek at Southern Cross	29 cfs	97%

Flint Creek near Drummond	64 cfs	102%
Rock Creek near Clinton	206 cfs	72%
North Fork Blackfoot near Ovando ¹	174 cfs	102%
Blackfoot near Bonner	589 cfs	88%
Bitterroot near Darby	383 cfs	122%
Bitterroot near Missoula	733 cfs	94%

¹ Short period of record, dominated by dry years

Region 3 (Bozeman)

Conditions have improved slightly in the Region. For the most part, we are out of the critical time period for summer, however we are not free of the chronic effects of continuing prolonged drought. Regionally, streamflows are averaging 50-80% of normal, with dry conditions concentrated in the Beaverhead/Centennial drainages.

The Big Hole River upper reach (uppermost 19 miles) was closed to angling on August 20 and remains closed at this time. The criterion for reopening this reach is that average daily flow must equal or exceed 40 cfs for 7 consecutive days at the USGS Wisdom Gauge. Last week following a good rainstorm and the closure of the Spokane ditch, flows increased and remained above 40 cfs for 5 days. However, since Saturday flows at Wisdom have declined to below 40 cfs. As of 9/17, the area was receiving steady rain and flows had again increased to 40 cfs. If they continue to improve the soonest we can expect to reopen this reach would be Monday September 23.

Clark Canyon Reservoir recently dropped to a record low of 12,000 acre-feet in water storage. Biologists contend that fish populations in that reservoir do well at 60,000 acre-feet, but fare poorly at storage pools near 40,000 acre-feet. Last year the lowest minimum pool in history at Clark Canyon was recorded at 29,000 acre-feet. The surface area this year has shrunk from more than 5,000 acres at full pool to fewer than 1,000 acres. The FWP Commission ordered a bag limit reduction to begin September 16 on Clark Canyon Reservoir due to low water. The Clark Canyon trout daily and possession limit was reduced from five fish to two fish, and the burbot (ling) daily and possession limit was reduced from ten fish to two fish. The bag limit reduction order will remain in effect until the general fishing season opener on the third Saturday of May, 2003.

Conditions are also bleak for the Beaverhead and Red Rock rivers. Extremely low flows are being experienced on both rivers for the third consecutive year. Flows as low as 50 cubic feet per second (cfs) have been recorded on the Beaverhead near Dillon. FWP's minimum recommended instream flow for the reach is 200 cfs. As a result, the FWP Commission also enacted closures on the upper Beaverhead River and the Red Rock River, which will begin October 7 and continue through November 30, 2002. The Beaverhead closure precludes fishing between Clark Canyon Dam and the Selway Bridge in Dillon, a distance of 30 river miles.

Flows on the Red Rock River vary between dry streambed conditions to flows of 15 to 30 cfs in isolated areas. On July 18, 2002, FWP asked anglers and landowners to voluntarily refrain from fishing the Red Rock River due to low flows. The Commission order closing the river to fishing is to further protect important and highly vulnerable spawning stocks of wild brown trout and mountain whitefish. The closure will be in effect on the river from Lima Dam to Clark Canyon Reservoir, a distance of 57 river miles.

As of 9/18, the Jefferson River at Twin Bridges was flowing over 600 cfs. This is about 30% below the long-term median flow for that date. The only drought-related activity is flow monitoring of the irrigation ditches to assess seepage loss during fall when measurements are less complicated by withdrawals. Streamflows of special interest that are gauged by the USGS are shown below.

Stream/Gauge Location	Flow on 9/17/02	% of long-term median flow for 9/17
Beaverhead River at Barretts	70 cfs	23%
Beaverhead River nr Twin Bridges	121 cfs	38%
Ruby River above Reservoir	117 cfs	108%
Ruby River below Reservoir	163 cfs	66%
Big Hole at Wisdom	40 cfs	136%
Big Hole below Mudd Creek	92 cfs	103%
Big Hole near Melrose	257 cfs	85%
Jefferson near Twin Bridges	489 cfs	53%
Jefferson near Three Forks	507 cfs	62%
Boulder River near Boulder	20 cfs	95%
Madison below Ennis Lake	1,140 cfs	83%
Gallatin near Gallatin Gateway	353 cfs	70%
Gallatin at Logan	384 cfs	72%
Missouri at Toston	1,810 cfs	63%
Yellowstone at Corwin Springs	1,500 cfs	54%
Yellowstone nr Livingston	1,780 cfs	81%
Shields near Livingston	75 cfs	77%

Region 4 (Great Falls)

In general, things are in fairly good shape in central and north-central Montana. Main waters of concern are the Smith, Missouri, and reservoirs in the eastern portion of the region. Flows in the Smith are down to only around 60 cfs, with a “normal” of around 100 cfs for this date (with the “normal” flow estimate for the Smith likely low due to gage site relocation immediately prior to a drought cycle).

The last update reported the Missouri below Holter as “beginning to increase”, which was incorrect. Apparently, there was a fluctuation or gage error on the day of that reporting. The river is still very low - around 2,900 cfs. Canyon Ferry surface water elevation is 9.3 feet higher than it was last year on this date. Obviously, the Bureau is being cautious with their releases. The fishery in this area dodged a water temperature “bullet” due to a cool August. Each monthly Bureau forecast is showing less and less projected flow below Holter. The latest forecast (for September) shows flows below Holter going to 3,300 in October, then 3,500 for November through March. Inflows for August were only 53% of normal. Our recommended minimum flow below Holter is 4,100 cfs. Obviously, the drought in southwest Montana persists.

There appears to be some improvement in Sun River water management. Flows at Simms are near 150 cfs, after bottoming out at around 50 cfs in mid-summer. Flows immediately below Diversion Dam have been somewhat variable lately but generally seem to have improved some in the first half of September. We recommend a minimum flow of 220 cfs during normal years and 100 cfs in

drought years. Flows below Diversion were around 50 cfs at the end of August and now seem to be averaging around 75 cfs. It appears this is a normal to above-normal water year in the Sun River drainage, so the low summer flows were unexpected. There is still some room for improvement here, but the trend for the moment is in the right direction.

The Marias River system is still in great shape. There is not much news on Bynum, though we do not expect overwinter problems. Bean Lake is still in tough shape, due to its small drainage basin area. Lake Frances is in very good shape – near full, and quite a turnaround from the last few years. The Teton is flowing reasonably well, compared to the past couple of years. The Musselshell is in terrible shape. The Region's eastern reservoirs (NF Smith River [Sutherlin], Bair, Martinsdale, Petrolia) are all extremely low or at dead storage. Apparently the summer rains didn't help them much – they are probably located outside the edge of the good summer precip area. Streamflows of special interest that are gauged by the USGS are shown below:

Stream/Gauge Location	Flow on 9/17/02	% of long-term median flow for 9/17
Prickly Pear near Clancy	14 cfs	56%
Tenmile Creek nr Rimini	0.37 cfs	37%
Little Prickly Pear at Wolf Creek	41 cfs	101%
Dearborn nr Craig	45 cfs	113%
Smith bl Eagle Creek ¹	77 cfs	78% ¹
Sun nr Simms	131 cfs	95%
Sun nr Vaughn	519 cfs	120%
Marias near Shelby	263 cfs	103%
Marias nr Chester	1,020 cfs	126%
Teton at Loma	19 cfs	317%
Musselshell nr Roundup	0.02 cfs	0.02%
Musselshell at Mosby	0 cfs	(median for date=53)
Missouri blw Holter	2,860 cfs	69%
Missouri at Ft. Benton	4,600 cfs	101%
Missouri nr Landusky	5,020 cfs	86%

¹ short period of record with several dry years

Region 5 (Billings)

Parts of Region 5 have come through the summer surprisingly well, considering conditions at the beginning of the year. Other areas in the Region continue to suffer from long-term drought effects. Water temperatures have peaked for the year and are falling.

The Yellowstone drainage, including the Boulder, Stillwater, and Clarks Fork rivers and Rock Creek, have flows below long term averages but are above levels where severe impacts to fisheries are expected. The upper Musselshell River has also remained in good shape. While water levels in Cooney Reservoir continue to hold up, Deadman's Basin remains very low.

The lower Musselshell continues to show zero flow except when a localized storm event occurs. The Bighorn drainage is going to remain in very tough shape for the foreseeable future. Buffalo Bill Reservoir is at 48% of normal while Boysen Reservoir is at 38%. Lake levels in Bighorn Lake have stabilized somewhat at very low levels. Boating on the lake will not be possible until runoff next spring (hopefully) refills the lake to the boat ramps.

The Bighorn River is taking on the appearance of a giant spring creek with flows stabilized at 1,500 cfs for the foreseeable future. Electrofishing the Mallards Landing section in September has shown some young fish, which were not evident in the upper section in June. In both sections the surviving adult brown and rainbow trout are in excellent body condition. Streamflows of special interest that are gauged by the USGS are shown below:

Stream/Gauge Location	Flow on 7/6/00	% of long-term median flow for 7/6
Musselshell at Harlowton	203 cfs	410%
Musselshell nr Roundup	0.02 cfs	0.02%
Boulder at Big Timber	91 cfs	54%
Stillwater nr Absarokee	409 cfs	68%
Clarks Fork at Edgar	276 cfs	62%
Rock Creek nr Red Lodge	112 cfs	89%
Red Lodge Creek bl Cooney Reservoir	99 cfs	95%
Yellowstone at Billings	2,240 cfs	58%
Bighorn near St. Xavier	1,450 cfs	57%
Bighorn ab Tullock Creek	1,540 cfs	54%

Region 6 (Glasgow)

The Milk River continues to have good flows at the eastern crossing of international boundary. At 776 cfs on 9/18, this is more than double normal median flows on this date. Favorable flows in the Milk, however, are not resulting in higher water levels in Fresno Reservoir, which is only at 45% of active conservation pool. Discharge is presently equal to Milk River inflow at Fresno. Further downstream, Nelson Reservoir is at 62% of active conservation pool; water levels are rising, as inflow is 193 cfs and outflow is 79 cfs. 9/18 flow at the mouth of the Milk River was 227 cfs, which was above median flow for the date. Most creeks flowing from the Bears Paw Mountains are near normal for this time of year.

The Missouri River above Ft. Peck Reservoir is at normal flow for this period. The reservoir level will continue to decline from its present elevation of 2,217.9 feet, as discharge exceeds inflow. Streamflows of special interest that are gauged by the USGS are shown below:

Stream/Gauge Location	Flow on 9/17/02	% of long-term median flow for 9/17
Musselshell at Mosby	0	(median for date=53)
Milk nr Harlem	621 cfs	219%
Milk at Nashua	215 cfs	114%
Missouri nr. Wolf Point	5,660 cfs	69%
Missouri near Culbertson	8,240 cfs	91%
Poplar nr Poplar	43 cfs	331%
Peoples Creek bl Kuhr Coulee	0.0 cfs	(median for date=0.03)

Region 7 (Miles City)

Streamflows of special interest that are gauged by the USGS are shown below:

Stream/Gauge Location	Flow on 9/17/02	% of long-term median flow for 9/17
Yellowstone at Forsyth	5,280 cfs	86%
Yellowstone at Miles City	4,380 cfs	61%
Yellowstone nr Sidney	4,390 cfs	64%
Tongue River at State Line	111 cfs	53%
Tongue at Tongue River Dam (TRD)	96 cfs	34%
Tongue at Miles City	22 cfs	11%
Powder at Moorhead	76 cfs	95%
Powder nr Locate	161 cfs	254%

Cc (electronic):

FWP Director, Commission Members

T. Palmer, D. Tipton – FWP, ConEd (for distribution to regional Information Officers)

FWP Regional Supervisors – Kalispell, Missoula, Bozeman, Great Falls, Billings, Glasgow, Miles City

Helena Fisheries Division staff, M. Minard

FWP Fish Managers and “Drought Biologists-2002”

FWP Wildlife Managers; Governor’s Drought Committee Staff and

Website (<http://nris.state.mt.us/drought/>)



Montana Fish, Wildlife & Parks

Memo To: Interested Parties

From: Kathleen Williams

Date: October 23, 2002

Subject: October 23rd Drought Update (corrected 10/25)

This update was prepared based upon written drought updates submitted by fish managers and other relevant updates and information.

General/Statewide

The long-term Palmer Drought Severity Index is calculated at a coarser scale than in years past. See current Index status at

http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif. The 10/19/02 version indicates "Extreme" drought conditions in the central, south-central, and southwest regions, "Severe" drought in the southeast, "Moderate" drought in the western portions of Montana, and "Near Normal" in the northeast. The 10/1/02 version of the U.S. Drought Monitor shows all of the state under some type of drought ranking. The severity zones radiate out from the southern portion of the state, where the drought designation is still "Severe". See <http://www.drought.unl.edu/dm/monitor.html>.

Normal precipitation levels may not translate to normal streamflow conditions when soil moisture is low, as a higher proportion of precipitation will be absorbed by soils and higher than normal withdrawals are likely. Areas with soil moisture deficits, and the scale of those deficits are illustrated in the "soil moisture anomaly" graphic at <http://www.cpc.ncep.noaa.gov/soilmst/img/curr.w.rank.daily.gif>. As of 10/22/02, western and southern Montana were showing moderate soil moisture deficits, with a severe pocket in the mid-southwest. Portions of far-northern Montana are registering soil moisture surpluses.

See <http://www.wrh.noaa.gov/greatfalls/text/seppcntnorm.html> for Montana precipitation as percent of normal for September 2002. The cumulative conditions since the beginning of the water year (10/1) are posted at http://www.wrh.noaa.gov/Greatfalls/text/wateryear_percent.html. Note the continuing wet pocket near Helena.

Another helpful graphic is located at http://www.cpc.ncep.noaa.gov/cgi-bin/anom_realtime.sh. This graphic is on a national basis, but is updated daily and displays running 30-day (or 90-day) departure from normal precipitation statistics. From the link, choose the bottom-most entry (for most recent date) in either column. The result is four graphics, with "% departure from normal precip" in the lower left. The last 30 days have been noticeably dry in portions of northwest, southwest and eastern Montana.

In previous years, NRCS staff have stopped updating the Surface Water Supply Index after September. This year, they have added an October 1st SWSI, which we very much appreciate. The SWSI blends factors for soil moisture, precipitation, snowpack, and reservoir storage, adjusting these factors for which are most determinant at the time. As shown at http://nrfs.state.mt.us/Nrcs/oct02/10_2swsi.jpg, the following streams are of concern:

Extremely Dry (rating of -4.0 to -3.0)	Stillwater (Yellowstone) (-2.6)
Beaverhead (-4.0)	Yellowstone above Bighorn (-2.6)
Bighorn below Bighorn Lake (-4.0)	Yellowstone above Livingston (-2.5)
Little Bighorn (-3.9)	Shields (-2.5)
Yellowstone below Bighorn (-3.8)	Boulder (Yellowstone) (-2.5)
Musselshell (-3.6)	Powder (-2.5)
	Ruby (-2.4)
Moderately Dry (rating of -2.9 to -2.0)	Missouri below Ft. Peck (-2.4)
Smith (-2.9)	Gallatin (-2.4)
Tongue (-2.9)	Missouri above Canyon Ferry (-2.3)
Clarks Fork Yellowstone (-2.8)	Missouri below Canyon Ferry (-2.1)
Clark Fork above. Milltown (-2.6)	Milk (-2.1)

Because the SWSI does not account well for soil moisture in eastern Montana (note how the SWSI graphics move from basins to just the stream channel for the Missouri, Musselshell, Yellowstone, etc. in eastern Montana), it is helpful to supplement that information with soil moisture information.

Reservoir storage conditions and projection graphs are at <http://www.gp.usbr.gov/wareprts/mtgraph0.htm>. Streamflows at USGS gauges are available through <http://waterdata.usgs.gov/mt/nwis/current?type=flow> (list of all Montana gauges with current flow) and http://water.usgs.gov/cgi-bin/daily_flow?mt (graphic showing which gauges are running low vs. high, across the state). On 10/23, flows hit new record lows for that date on the Beaverhead, Ruby (below reservoir), Bighorn, and Little Bighorn rivers.

A helpful (and frequently updated) source of agricultural-related climate information and activities is the Crop Weather Report, at <http://www.nass.usda.gov/mt/>; choose “crop weather”, then the report you’re interested in. These are updated weekly. See <http://iwin.nws.noaa.gov/iwin/mt/state.html> for the five-day zonal weather forecast by the National Weather Service.

A graphic assessing current fire risk is at <http://orbit-net.nesdis.noaa.gov/crad/sat/surf/vci/usafr.html>. The Weekly Fire Weather/Fire Danger Outlook has been discontinued for 2002.

Will drought conditions continue in Montana? The 10/17/02 U.S. Seasonal Drought Outlook (though January 2003), shows drought conditions expected to persist across much of central and southern Montana. The Outlook also predicts expansion of drought conditions in northwestern Montana. See http://www.cpc.ncep.noaa.gov/products/expert_assessment/seasonal_drought.html. See also http://www.cpc.ncep.noaa.gov/products/predictions/multi_season/13_seasonal_outlooks/color/churchill.html for graphics showing that, as of October 17th, Montana is predicted to have above-normal

temperatures through spring of 2003. Precipitation is forecast to be below normal this winter and the following spring, with the strongest anomalies during winter.

Region 1 (Kalispell)

October has been warmer than usual and one of the driest on record with just a trace of precipitation. This will not help groundwater recharge. Despite that, there are no unusual drought-related problems.

Bull trout redd counts in the region are about complete and appear to be within the normal range. There have been no known low-flow problems this season that would limit bull trout access to spawning areas, due to timely and sufficient rain events and near-normal stream flows.

PPL Montana, under orders from the Federal Energy Regulatory Commission, held public scoping meetings last spring preparatory to developing a drought management plan for Flathead Lake/Kerr Dam as a condition for relicensing. The Bureau of Indian Affairs is now holding its own scoping meetings to ensure tribal trust obligations are protected.

Streamflows of special interest that are gauged by the USGS are shown below.

Stream/Gauge Location	Flow on 10/23/02	% of long-term median flow for 10/23
Tobacco River near Eureka ¹	78 cfs	72%
Yaak River near Troy	86 cfs	49%
North Fork Flathead near Columbia Falls	797 cfs	85%
Middle Fork Flathead near W. Glacier	524 cfs	68%
South Fork Flathead above Twin Creek	289 cfs	66%
South Fork Flathead near Columbia Falls	2,430 cfs	196%
Flathead River at Columbia Falls	3,620 cfs	89%
Stillwater near Whitefish	94 cfs	88%
Whitefish River near Kalispell	41 cfs	63%
Swan River near Bigfork	333 cfs	65%
Clark Fork River at St. Regis	2,540 cfs	75%
Clark Fork near Plains	6,330 cfs	61%

Region 2

Streamflows of special interest that are gauged by the USGS are shown below.

Stream/Gauge Location	Flow on 10/23/02	% of long-term median flow for 10/23
Clark Fork at Deer Lodge	125 cfs	48%
Clark Fork near Drummond	420 cfs	63%
Clark Fork above Missoula	1,110 cfs	73%
Little Blackfoot near Garrison	51 cfs	73%
Flint Creek at Southern Cross	7.3 cfs	28%
Flint Creek near Drummond	144 cfs	95%
Rock Creek near Clinton	193 cfs	78%
North Fork Blackfoot near Ovando ¹	131 cfs	82%

Blackfoot near Bonner	523 cfs	85%
Bitterroot near Darby	207 cfs	67%
Bitterroot near Missoula	603 cfs	58%

¹ Short period of record, dominated by dry years

Region 3 (Bozeman)

Big Hole River flows are holding up better than other waters in the area due to timely precipitation and the end of irrigation. The upper reach (Rock Creek to the North Fork) angling closure has been lifted and flows at Wisdom gauge are averaging about 50 cfs. Flows in the middle reach (North Fork to Dickie Bridge) are fair at about 130 cfs. Flows in the lower reach (Dickie Bridge to mouth) are pretty good in the 315-350 cfs range at the three lower gages. No drought-related fishing restrictions are in effect.

Red Rock flows are extremely low with releases from Lima Dam at about 11 cfs. An angling closure is in effect from October 7 - November 30, between Lima Dam and Clark Canyon reservoir. A bag limit reduction to 3 trout has also been in effect and will continue through into the general fishing season (opens third Saturday of May, 2003).

Upper Ruby River flows have recovered to the 115 - 120 cfs range. Lower river flows are reduced to about 40 cfs in the tailwater reach but return flow accretions are holding lower reach flows up very well. No drought restrictions are in effect on the Ruby.

Beaverhead flows are extremely low with Clark Canyon Dam releases between 28 and 30 cfs. Downstream flows at High Bridge and Henneberry fishing access sites were measured at only 40 to 50 cfs, while the Barretts gauge has been reading about 80-85 cfs. Flows at the Dillon gauge have hovered around 100 cfs and flows at Beaverhead Rock have finally recovered to about 175 with the return flows kicking in. A fall angling closure is in effect October 7 through November 30 from the dam to the Selway Bridge in Dillon. Similar to Red Rock a bag limit reduction to three trout has been in effect from the dam to Anderson Lane, which will continue into the general fishing season.

Clark Canyon reservoir storage is slowly being recovered as dam releases have been reduced to about 28 cfs. Storage is about 21,000 acre feet which is still substantially below the record low pool of 29,900 acre feet set in 2001. Reservoir angling restrictions reducing bag limits to only 2 trout and 2 burbot are in effect.

The Jefferson River is going into the fall at flows about 50% of normal. FWP, Trout Unlimited, and DNRC staff collected flow information during 2002 in the three major canals at multiple locations to attempt to document ditch loss. A summary of this information will be made available this winter. As of last week, a second flow run along the 11-mile reach of the Jefferson Canal, which was treated with Seal-It was completed. Preliminarily, it appeared the lower 6 miles of the canal were reasonably water tight. The upper canal still had some seepage loss. Water users in this canal offered anecdotal information that the Seal-It experiment helped with water management this year. The data summary will be used to offer better documentation of what are now only anecdotal conclusions.

Monitoring of the water lease at Hells Canyon Creek confirmed that flows did not fall below the leased quantity of 0.25 cfs during the summer. Flow was less than 1.0 cfs for about 2 weeks.

Streamflows of special interest that are gauged by the USGS are shown below.

Stream/Gauge Location	Flow on 10/23/02	% of long-term median flow for 10/23
Beaverhead River at Barretts	93 cfs	28%
Beaverhead River nr Twin Bridges	183 cfs	42%
Ruby River above Reservoir	110 cfs	90%
Ruby River below Reservoir	37 cfs	45%
Big Hole at Wisdom	53 cfs	82%
Big Hole below Mudd Creek	127 cfs	65%
Big Hole near Melrose	325 cfs	66%
Jefferson near Twin Bridges	660 cfs	48%
Jefferson near Three Forks	808 cfs	45%
Boulder River near Boulder	16 cfs	47%
Madison below Ennis Lake	1,200 cfs	60%
Gallatin near Gallatin Gateway	317 cfs	75%
Gallatin at Logan	471 cfs	61%
Missouri at Toston	2,650 cfs	57%
Yellowstone at Corwin Springs	1,100 cfs	78%
Yellowstone nr Livingston	1,500 cfs	78%
Shields near Livingston	105 cfs	69%

Region 4 (Great Falls)

Improvements in drought conditions in the region appear to be taking a step backward.

Canyon Ferry inflow on 10/22 was 2,570 cfs at Toston, with a long-term normal for the date of 4,605 cfs (flows are 56% of normal). Bureau of Reclamation staff confirm that the drought in southwestern Montana is just not letting up. Canyon Ferry water surface elevations are slipping behind last month's "Most Probable" estimate, meaning conditions are even drier than last month's estimate, which was conservative to begin with. Flows below Holter will stay around 3,000 cfs until it is clear that storage is adequate to step up flow without drawing Canyon Ferry down too much. One should probably plan for another dry year, given the current trends and outlook.

Normal flow for the Smith river for 10/22 is 135 cfs, with current flow at 94 cfs (70% of normal). However, the gauge was relocated in fall 1996, and four of the five years at the new gauge location have had flows well below normal. The true "normal" flow for the new gauge site is probably around 250 cfs.

Flow in the Dearborn River on 10/22 was 44 cfs - only 59% of normal for the date. Sun River flow at Simms on 10/22 was 180 cfs, which is not too bad (89% of normal). However, flow into Gibson has been decreasing thru October and is now down around 160 cfs, which is only 56% of normal for October.

The Marias system is still doing well, as it has all year. Flows into Tiber are at normal levels and outflow from Tiber is well above normal, as operators draft the reservoir somewhat. The Teton is in fairly good shape, flowing above normal rates for the date near the mouth. In general, the northern end of the Front has fared well this year. Flow in the Judith at the mouth is also about normal.

The lake/reservoir situation in the region is mixed. Tiber and Lake Frances are in excellent shape. Bynum is quite a bit better than last year but still well below normal. Some fish of all species made it through last year, when maximum depth under the ice was only about 5-6 feet! The aeration project last winter and may have really helped. We do not have to aerate this year as maximum depth is probably around 15 feet or so. Bean Lake is hurting badly. It has a tiny drainage area and surface levels have continued to drop the past few years. Stocked rainbow trout appear to be suffering greatly from excessive alkalinity. Gill net catches this fall were very low and survival appears poor. Staff are debating whether to aerate this winter.

Further east, Newlan Creek Reservoir, near White Sulphur Springs, has a decent water level due to the fact that water was alternatively diverted from Sheep Creek this year. Lake Sutherlin (NF Smith River drainage) appears rather low and Bair Reservoir (headwaters of Musselshell) is extremely low. Martinsdale Reservoir (offstream Musselshell) is only at 4% of capacity, which is essentially empty. YellowWater Reservoir had a maximum depth of only 1.5 feet in early September. The maximum depth on Petrolia Reservoir was 9 feet in early September.

Streamflows of special interest that are gauged by the USGS are shown below:

Stream/Gauge Location	Flow on 10/23/02	% of long-term median flow for 10/23
Prickly Pear near Clancy	17 cfs	61%
Tenmile Creek nr Rimini	0.25 cfs	21%
Little Prickly Pear at Wolf Creek	43 cfs	88%
Dearborn nr Craig	43 cfs	57%
Smith bl Eagle Creek ¹	79 cfs	56% ¹
Sun nr Simms	180 cfs	89%
Sun nr Vaughn	448 cfs	127%
Marias near Shelby	347 cfs	106%
Marias nr Chester	897 cfs	154%
Teton at Loma	41 cfs	132%
Musselshell nr Roundup	27 cfs	45%
Musselshell at Mosby	1.3 cfs	2.2%
Missouri blw Holter	3,130 cfs	70%
Missouri at Ft. Benton	4,490 cfs	87%
Missouri nr Landusky	5,460 cfs	83%

¹ short period of record with several dry years

Region 5 (Billings)

The Yellowstone drainage, including the Boulder, Stillwater, and Clarks Fork rivers and Rock Creek, have flows that are below long term averages, but above levels where severe impacts to fisheries are expected.

As of 10/22, several of the gauges in the upper Musselshell River were not reporting. Flows in this system remain very low, grading to nil at Mosby. The town of Melstone was considering pumping from one of the remaining Musselshell in-channel puddles, but is now exploring drilling a new well about 5.5 miles south of the river. Deadmans Basin sampling indicates that rainbow trout and kokanee are surviving in reasonable numbers. One 10-pound tiger muskie was collected.

The October 1 SWSI for the Bighorn River is the lowest possible at -4.0, with the Little Bighorn at -3.9. On October 24, several agencies and people representing diverse interests will meet to discuss options for dealing with grim water forecasts in this system. One option includes reducing Yellowtail outflows from 1,500 cfs to 1,300 cfs. The latest Bighorn River provisional fish population estimates are the lowest ever recorded, with especially severe declines for brown trout. Bighorn Lake volume remains at about 61% of the active conservation pool. The National Park Service may extend the boat ramps at Ok-a-Beh and Barry's Landing to allow some boat launching next year.

Streamflows of special interest that are gauged by the USGS are shown below:

Stream/Gauge Location	Flow on 10/23/02	% of long-term median flow for 10/23
Musselshell at Harlowton	NA	NA
Musselshell nr Roundup	27 cfs	45%
Boulder at Big Timber	145 cfs	70%
Stillwater nr Absarokee	418 cfs	87%
Clarks Fork at Edgar	507 cfs	98%
Rock Creek nr Red Lodge	61 cfs	85%
Red Lodge Creek bl Cooney Reservoir	20 cfs	29%
Yellowstone at Billings	2,920 cfs	75%
Bighorn near St. Xavier	1,870 cfs	62%
Bighorn ab Tullock Creek	1,130 cfs	35%

Region 6 (Glasgow)

As of 10/22, flows in the Missouri River above Ft. Peck were slightly below long term median flows for this time of year at 5,390 cfs. Water level on Ft. Peck reservoir will continue to drop through February, as discharges nearly double from December through February. The present outflow of 5,000 cfs will be maintained through November.

On the Milk River near the East Crossing of the International Boundary flows are above normal at 132 cfs. Fresno Reservoir is 51% full and Nelson Reservoir is 85% full. We anticipate water levels in these reservoirs to continue to climb as irrigation season is over. Flow at the mouth of the Milk River is 130 cfs, which is slightly below normal for this time of year.

Most of the small reservoirs around the region are at higher levels than this past spring due to fall precipitation.

Streamflows of special interest that are gauged by the USGS are shown below:

Stream/Gauge Location	Flow on 10/23/02	% of long-term median flow for 10/23
Musselshell at Mosby	1.3 cfs	2.2%
Milk nr Harlem	151 cfs	136%
Milk at Nashua	127 cfs	86%
Missouri near Landusky	5,460 cfs	83%
Missouri nr. Wolf Point	4,870 cfs	61%
Missouri near Culbertson	5,200 cfs	54%
Poplar nr Poplar	NA	NA
Peoples Creek bl Kuhr Coulee	0.0 cfs	(median for date=1.8)

Region 7 (Miles City)

Streamflows of special interest that are gauged by the USGS are shown below:

Stream/Gauge Location	Flow on 10/23/02	% of long-term median flow for 10/23
Yellowstone at Forsyth	4,490 cfs	63%
Yellowstone at Miles City	4,750 cfs	61%
Yellowstone nr Sidney	4,900 cfs	60%
Tongue River at State Line	152 cfs	61%
Tongue at Tongue River Dam (TRD)	81 cfs	36%
Tongue at Miles City	111 cfs	43%
Powder at Moorhead	169 cfs	75%
Powder nr Locate	140 cfs	60%

Cc (electronic):

FWP Director, Commission Members

T. Palmer, D. Tipton – FWP, ConEd (for distribution to regional Information Officers)

FWP Regional Supervisors – Kalispell, Missoula, Bozeman, Great Falls, Billings, Glasgow, Miles City

Helena Fisheries Division staff, M. Minard

FWP Fish Managers and “Drought Biologists-2002”

FWP Wildlife Managers; Governor’s Drought Committee Staff and

Website (<http://nr.is.state.mt.us/drought/>)

Appendix B

FWP (Partial) Chronology of Relevant Drought Media Coverage, 2002

Note: In contrast to appendices included in FWP's annual Drought Summaries for 2000 and 2001, this chronology is not as complete, due to less coverage of drought by FWP's clipping service. Below are selected headlines, but this list is likely far from exhaustive for 2002. Some referenced stories also related to high water levels in 2002 which occurred in localized areas for short periods.

January 2002:

1/02/02

Choteau Acantha-State closes Bean, Bynum to fishing

February 2002:

2/27/02

Dillon Tribune-Drought Task Force meets to discuss outlook

2/28/02

Daily Interlake-Drought-year funding available

March 2002:

3/07/02

Billings Gazette-Pray for snow, rain to boost flows for trout. Whirling disease impact.

3/08/02

Livingston Enterprise-Yellowstone River fish numbers constant

3/28/02

Low flows threaten fish, but not users' water rights

April 2002:

4/01/02-

Miles City Star-Many possible solutions for whirling disease

4/02/02

Researchers: Many possible solutions for whirling disease

4/02/02

Livingston Enterprise-Solutions proposed for Whirling Disease

4/04/02

Glacier Reporter-Reservation fisheries in uncertain condition following years of drought

Billings Gazette-2 articles

Bighorn trout numbers fall-prolonged drought affecting even this safe haven

Many Solutions Possible for Whirling Disease

Havre Daily News-Solutions possible for Whirling Disease (same as above)

4/24/02

Havre Daily News-Managing grazing land to protect fisheries

Park County Weekly- (same article as above) Ranchers work to improve fishery

4/25/02

Billings Gazette-Trickle-Down-Drought stresses trout population on the Musselshell River (photos of FWP Billings staff)

4/29/02

Montana Standard-Working together to save water- TU, irrigators team up (canal seal product on Jefferson River)

4/30/02

Billings Gazette (same article as above) Irrigation ditch sealed to save water

May 2002

5/01/02

Whitehall Ledger-With a little water, the Jefferson fishery would rebound with browns and rainbows

5/05/02

Billings Gazette-Bighorn Lake near lowest ebb-Lake level within 1 foot of 1989's record low
5/09/02

Montana Standard-Drought hits farmers, fisheries
5/14/02

Billings Gazette-Water Fight (Fort Peck) - Montana now among states looking to courts to maintain water levels.

5/17/02

'We'll know D4 drought when we see it' - The bulls eye is right over Montana

5/22/02

Anaconda Leader-Judge's rule leaves lake dispute unresolved. A federal judge ruled earlier this month that his court does not have jurisdiction over a dispute about how much water Granite County releases from Georgetown Lake.

June 2002

6/05/02

Whitehall Ledger-Fishing closures possible

6/12/02

Livingston Enterprise-Drought restrictions set

6/16/02

Montana Standard-Fisheries biologist (Dick Oswald-Dillon) predicts river closures this summer (Beaverhead and Big Hole rivers)

6/26/02

Billings Gazette-Bighorn Lake officials plan to cut outflow

6/28/02

Havre Daily News-Water level doesn't stop fishery plans (Fresno reservoir)

6/29/02

Butte Weekly-Madison River abuse ruining fishery

6/31/02

Jordan Tribune-paddlefish anglers face low flowing Yellowstone

July 2002

7/2/02

Havre Daily News-Dam releases threaten fish

Daily Interlake-Emergency declared as Kootenai River rises; Libby Dam outflow highest in three decades

7/4/02

Daily Interlake-Kootenai River fish show affects of gas poisoning

7/7/02

Billings Gazette-Private Ponds, Public Problems – Growing number of ponds use up scarce water supply

7/18/02

The Livingston Enterprise-Three park rivers closed to fishing (Firehole, Gibbon, Madison)

7/25/02

Blackfoot Valley Dispatch-Blackfoot not out of the drought yet

7/31/03

Dillon Tribune-STRESS: Anglers warned about fish stress from high temperatures, low water in rivers, area reservoirs

August 2002

8/01/02

Bozeman Daily Chronicle-Trout Roundup-Rescue efforts saves fish stranded in irrigation ditch near Gallatin Gateway

8/02/02

Western News-County, MP ask Governor to stop the flows. The county wants lower flows in the river so the reservoir drops no more than 10 feet.

8/7/02

Whitehall Leader-Groups team up to help Montana's fisheries; here are tips to make sure the "release" in catch and release helps fish survive.

8/8/02

Billings Gazette-Keep finders crossed for our fisheries; Better than 2001; Drought widespread; Flows too low

8/9/02

Daily Interlake-Kootenai release for salmon is criticized; Libby dam flows not floating with some critics

8/14/02

Daily Interlake-State getting short end of spigot (editorial) (salmon flows vs. HH/Libby levels)

September 2002

Billings Gazette-Time to push for marina at Barry's (Bighorn lake)

October, 2002

10/3/02

Billings Gazette-BLM (should be BuRec) may reduce dam releases (Bighorn)

10/17/02

Sanders County Ledger – State lab still puzzled in cause of fish deaths

Appendix C

FWP DROUGHT FISHING CLOSURE POLICY - 2002

Montana supports some of North America's most popular fisheries, and through its wild trout policies, encourages self-sustaining fish communities. Water use and natural events, like drought, are part of the equation. While we cannot control natural events, we can limit the additive impact of angling mortality during the stressful conditions created by drought, and help aquatic communities survive the crisis with a better chance to recover quickly. This drought strategy is an attempt to balance recreational opportunity with resource protections based on biological considerations, and to some extent, social parameters.

Introduction

The mission of the FWP Fisheries Program is to preserve, maintain and enhance aquatic species and their ecosystems to meet the public's demand for recreational opportunities and stewardship of aquatic wildlife. Low flow conditions during drought may require temporary restrictions on fishing to protect fish populations and sustain future opportunity.

Drought impacts each stream reach differently, although reduced summer stream flow consistently reduces available habitat and increases temperature, stress and predation. To ensure that fisheries are protected under critical drought conditions, a set of criteria has been developed to guide fishing closure decisions. The following guidelines will be considered for each closure decision:

- Decisions should be based on the best biology/science available to support resource protection.
- Good public information should be provided.
- Informational and voluntary measures may be attempted, if conditions allow, before imposing mandatory restrictions.
- Efforts should be made to maintain and/or redirect recreational opportunities where possible.

Objectives

1. Protect long-term health of aquatic systems from impacts of severe drought, especially waters supporting species of special concern.
2. Cooperate with watershed groups to maintain instream flows.
3. Maintain access to fisheries less impacted by drought, thereby minimizing the impact of concentrating fishing pressure on few waters.
4. Provide consistency in decisions across the state.
5. Inform the public regarding the need for and value of conservation measures.

Classification of Fisheries

Each region will classify priority fisheries (those fisheries that are self-sustaining and receive significant angler use or vulnerable waters that receive significant angler use) into the following categories:

- Watersheds with drought plans in place.
On some streams, watershed groups composed of local agriculture, conservation, business, and angler interests have developed individualized drought plans to address site-specific stream flow and fishery issues. These drought plans will direct drought-related actions in the waters covered by them.
- Critical fisheries.
Fisheries with species of special concern (e.g., bull trout, grayling, sauger) or high angler use that are expected to be severely affected by drought conditions. For drought planning purposes, these fisheries can sustain fishing pressure up to a point, after which continued angling pressure may be detrimental. This classification generally includes larger, valley-bottom rivers and their tributaries.
- Tailwater fisheries:
These are fisheries that exist in tailwaters below reservoirs. Because of the human influence on flows and temperatures resulting from dam operations, drought impacts may be different than in natural-flowing waters. For example, flows may be drastically reduced in the fall to maximize refill of reservoirs. In such situations, when dam operations result in severely reduced flows or alterations to the thermal regime, closures may be recommended.
- Drought-resistant fisheries:
Those priority fisheries, especially lakes and reservoirs, that can sustain fishing pressure despite the impacts of drought. These waters will remain open to angling unless drastically reduced water levels or other conditions create a public safety concern.

Process to Change Regulations:

1. Regional/field staff regularly assess stream/lake conditions and coordinate as needed with local interested parties.
2. Region identifies problem to Helena and submits proposed change with rationale.

Streams: FWP may impose more restrictive regulations, or even close a stream to fishing, when flow or water temperatures reach critical levels. Decisions to close waters to fishing may have been negotiated with local watershed management groups.

Lakes and Reservoirs: Where fish populations are supported by stocking, FWP may liberalize or remove limits when water levels reach the point where survival of fish (through the summer or over winter) is doubtful. If low water levels or high water temperatures will

jeopardize survival of the populations, consider allowing maximum harvest of fish. Some waters may be deleted from the planting schedule. Actions are taken on a case-by-case basis.

3. Helena Fisheries Division coordinates with Director and Commission.
4. Commission adopts emergency regulation.
5. Press release announces implementation of regulation change. Signs are prepared and areas are posted as necessary.

Fishing Closure Decisions

Criteria for evaluating drought impact are based on site-specific stream flow or lake/reservoir levels and water temperature. Established threshold levels for salmonids and for bull trout will initiate the discussion for appropriate action to protect the fisheries. Voluntary restrictions may be recommended before threshold levels are reached. Some waters will not reach the established threshold levels but may require action to protect the fisheries anyway (e.g., Missouri River). Other waters may reach threshold levels but may not warrant mandatory fishing closure because of site-specific conditions such as self-regulating angling pressure or success of voluntary restrictions. Justification for closure recommendations will be provided for any water that is recommended for emergency fishing closure. Water users holding water rights junior to FWP instream flows will be contacted to cease further diversions, and water conservation measures will continue to be encouraged in watersheds closed to angling.

Thresholds for Salmonids: (Excluding Bull Trout)

- Flows are at the 95% monthly exceedence level (1-in-20-year low flows); or
- Daily maximum water temperature reaches or exceeds 73° degrees F (23° C) for at least some period of time during three consecutive days.

Thresholds for Bull Trout:

- In critical bull trout spawning and rearing streams, daily maximum water temperature equals or exceeds 60 ° F (15° C) for three consecutive days, and bull trout are vulnerable in cold water refuges.

Closure Options:

The following options may be implemented when thresholds described above are reached. The decision whether to implement a particular closure option will depend on the threat to the fisheries, as well as existing and projected fishing pressure:

- **Voluntary Restrictions:** may be recommended if temperature or flow conditions are approaching the thresholds described above, if a drought-related problem is anticipated, or if the fishery would benefit from reduced angling pressure.

- **Time-of-Day Closure:** prohibits fishing between the hours of 12:00 p.m. (Noon) and 12:00 a.m. (Midnight). Until August 15, Time-of-Day closures will be automatically implemented in priority waters (Attachment 1) once thresholds are reached, and in other waters if conditions warrant. They will remain in place until September 15. After August 15, the decision to close any waters (vs. voluntary restrictions) will be made on a case-by-case basis. On September 15, all waters will be open unless an earlier/later date is designated by the FWP Commission for a specific water.
- **Full Closure:** prohibits all fishing on the designated water. Appropriate for waters with species of special concern, areas experiencing high mortality, areas with critically low dissolved oxygen (≤ 4 ppm measured in the early morning before sunrise), or in specific areas with extremely low flows that threaten the fishery resources (e.g., spawning sites, or excessive angling pressure concerns). Full closures may be implemented in priority waters that meet the thresholds, and in which Time-of-Day Closures are inadequate, and in other waters if conditions warrant. Closures will be lifted on September 15 unless an earlier/later date is specified by the Commission based on the criteria used to recommend the closure, or a pre-established time frame selected to provide adequate protection for the fishery.

Unresolved Issues

- **Shifts in angling pressure:** Broader application of closures may be necessary to address excessive angling pressure on remaining open waters in extreme drought conditions. Shifts in angling pressure will be monitored if closures are implemented. Appropriate levels of response will be based on further discussion with the FWP Commission and the public, and may include restrictions to reduce excessive overcrowding or angling pressure.

Priority Waters

The following list of priority waters was developed based on the likelihood they will reach or exceed the drought flow/temperature thresholds in 2002, and have high angling pressure. If the flow or temperature threshold is reached in any of these waters by August 15, that water will automatically be closed from Noon to Midnight, unless a full closure is warranted. If the thresholds are reached after August 15, the decision to close that water will be made on a case by case basis. If a water is already covered under an existing drought management plan, it will be closed according to the criteria in that plan, summarized below. Beginning June 1, the status of these waters will be regularly updated and can be viewed on the FWP website.

FWP Region 1:

- Thompson River

FWP Region 2:

- Blackfoot River - Drought Management Plan – The Blackfoot River and bull trout core area tributaries will be closed to fishing when flows at the Bonner Gauge fall below 400 cfs. Core area tributaries include: North Fork Blackfoot, Monture Creek, Copper Creek, Cottonwood

Creek, Clearwater River above Rainy Lake, Deer Creek, Placid Creek, Belmont Creek, Gold Creek, Landers Fork, W. Fork Clearwater, and Morell Creek.

- St. Regis River

FWP Region 3:

- Big Hole River (Upper) – Drought Management Plan – (1) Close to fishing when flows fall below 20 cfs at Wisdom. Reopen only after flows exceed 40 cfs for seven consecutive days. (2) Close to fishing when temperatures exceed 70° F for more than 8 hours per day for three consecutive days. Remain closed until water temperatures do not exceed 70° F for more than 8 hours per day for three consecutive days and flows are greater than 30 cfs for seven consecutive days.
- Big Hole River (Middle) – Drought Management Plan - (1) Close to fishing when flows fall below 60 cfs at the Mudd Creek Gauge, or temperatures exceed 70° F for over 8 hours per day for three consecutive days. Reopen only after flows exceed 80 cfs for seven consecutive days and water temperatures do not exceed 70° F for more than 8 hours per day for three consecutive days.
- Big Hole River (Lower) – Drought Management Plan - Close to fishing when flows fall below 150 cfs at the Melrose Gauge. Reopen only after flows exceed 200 cfs for seven consecutive days.
- Jefferson River – (from confluence of Big Hole, Ruby, and Beaverhead Rivers to confluence with Madison and Gallatin Rivers) Drought Management Plan - Close to fishing when flows fall below 250 cfs at the Twin Bridges Gauge. Reopen only after flows exceed 300 cfs for seven consecutive days.
- East Gallatin River
- Gallatin River (below Highway 191 Bridge)
- Madison River (below Ennis Dam)
- Beaverhead River (below Park Street Bridge)
- Yellowstone (from Yellowstone NP to Park County Line)
- Shields River
- Red Rock
- Missouri (from Headwater State Park to Canyon Ferry Reservoir)

FWP Region 4:

- Smith
- Sun River (below Gibson Dam)

FWP Region 5:

- Boulder River (below Natural Bridge)
- Stillwater River
- Yellowstone (from Park County Line to Huntley Diversion)

Appendix D

2002 Year-End Fishery Drought Impacts Summary

Statewide, areas experiencing prolonged drought have severely depleted soil moisture levels. Normal precipitation will be absorbed and will not produce normal streamflow in the near term. It will take several years of average or above average precipitation to restore streamflows. Statewide, low flows have impacted spawning and juvenile fish survival in many lakes and streams.

Below is a region-by region assessment of what was known about potential drought impacts to Montana's fisheries as of January 2003. Drought impacts to fisheries may not show up several years after the low flow events. Effects can include missing age/size classes, reduced growth rates, reduced fish densities, poor fish condition (e.g. parasitism). etc. We will continue to assess and document fishery conditions, including potential drought impacts, as additional data become available.

Region 1 (Kalispell)

A cold, wet spring in northwest Montana built snowpack into May and delayed snowmelt, producing good streamflows into summer and reducing drought impacts. Dry conditions in late summer caused streamflows to decline, forcing FWP to notify junior water rights holders on Youngs Creek and the Tobacco River, waters where FWP holds instream rights, on the potential need to close their diversions in order to preserve instream flows. Because irrigation was essentially over for the season, no further action was taken. Low precipitation in August, September, and October once again caused a moisture deficit that could carry over into 2003. Overall, no obvious drought-related fishery problems occurred in R-1 in 2002.

Lakes and Reservoirs

Pennsylvania Power and Light (PPL Montana), which is a co-licensee for Kerr Dam with the Confederated Salish and Kootenai Tribe, was ordered by the Federal Energy Regulatory Commission to prepare a drought management plan for Flathead Lake as a license condition, and to provide a planned response to drought conditions which produced the lake level fluctuations in summer 2001. PPL Montana held several scoping sessions preparatory to a plan. The Bureau of Indian Affairs followed up with its own scoping sessions to ensure tribal interests were protected. Good runoff prevented problems with Flathead Lake in 2002 and allowed Hungry Horse Reservoir and Lake Koocanusa (Libby Dam) to refill.

A bacterial infection caused a major die-off of lake whitefish and other species in Noxon Rapids Reservoir in late summer. What role, if any, low flows played is unknown.

Bull and Cutthroat Trout

Bull and cutthroat trout monitoring surveys found generally good numbers of juvenile westslope cutthroat and bull trout in Flathead tributaries. There were no impediments to upstream spawning migrations. However, bull trout redd or spawning bed counts were generally down in northwest Montana in fall 2002. Much of that was attributed to poor recruitment from weak year

classes produced by drought conditions in the early 1990s (bull trout take about six years to mature).

Region 2 (Missoula)

Drought impacts on fisheries in Region 2 were minimal during the summer of 2002. Conditions generally ranged from slightly dry to slightly wet. Streamflow was lower than expected given the precipitation and was attributed to prior years' drought and the refilling of aquifers. Still, streamflows were generally at or just below average.

Bull Trout

Long-term data encompassing the recent drought have been collected for two key bull trout spawning tributaries in the Blackfoot drainage—Monture Creek and the North Fork Blackfoot River.

The North Fork appears naturally prone to dewatering, a problem exacerbated by irrigation withdrawals in its lower reaches. In severe drought years, the North Fork goes intermittent in sections, resulting in the loss of rearing habitat for young bull trout, harsher survival conditions over winter, the trapping of upstream migrating spawners and downstream returning spent adults in intermittent pools, and the blocking of access to upstream spawning areas. In contrast, the aquatic environment of Monture Creek is less degraded and more suited for bull trout survival—more stable flows in spawning and rearing areas; more stable rearing conditions; secure, high quality staging areas for spawners; and, better access to and from spawning sites.

Both spawning populations—Monture Creek and the North Fork—were increasing (based on redd (i.e., fish nests) counts) the ten years prior to the drought, the result of protective regulations initiated in 1990 and the habitat restoration program, also begun in 1990 (see Figure 1).

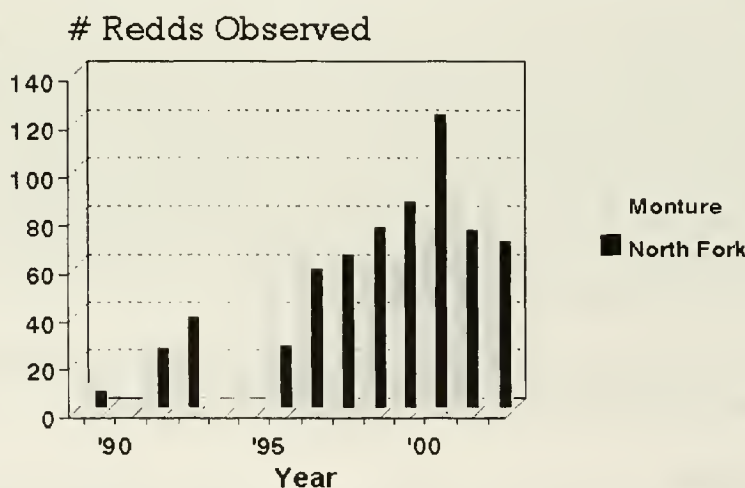


Figure 1. Bull trout redd counts for index sections of Monture Creek and the North Fork Blackfoot River, 1989-2002.

However, redd counts in the North Fork declined during the drought and juvenile bull trout numbers plummeted [Figures 1 and 2]. In contrast, redd counts in Monture Creek continued to increase and juvenile densities showed little change (see Figures 1 and 2), a response likely related to the better relative habitat available in Monture Creek under drought conditions.

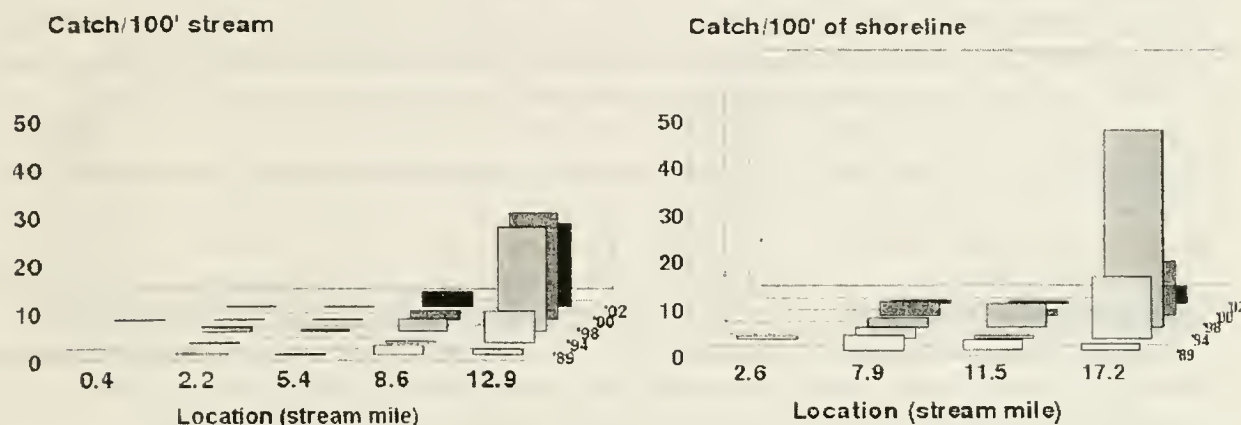


Figure 2. Electrofishing catch for juvenile bull trout in index sections of Monture Creek (left) and North Fork of the Blackfoot River (right), 1989-2002.

Bitterroot River

FWP's fisheries target flow of 400 cfs at Bell Crossing was generally met during summer 2002. Summer flow, which hit a low of 338 cfs, dropped below 400 cfs only five days in 2002, as compared to 65 days in 2001. Dewatering was not a serious threat on the Bitterroot in 2002.

Blackfoot River

The river's cutthroat population, which has been on an upward trend the past ten years, declined slightly in 2002. Rainbow trout—the dominant trout species in the Blackfoot—are faring okay. However, numbers of young rainbows are down, a likely consequence of long-term drought. Brown trout numbers continue to hold up. The bull trout population continues to grow, although a significant population decline in one of two mainstem study sections was measured in 2002.

Upper Clark Fork River

Unlike other waters in the region, the upper Clark Fork (in the Deer Lodge area) remained locked in drought in 2002. The upper Clark Fork drainage received the least precipitation within the region. Brown trout numbers continued to decline in 2002 in FWP's Warm Springs study section.

Region 3 (Bozeman)

Madison River

Flushing flows intended for gravel and side channel maintenance were not released from Hebgen Reservoir in 2002 in order to conserve water for minimum fishery maintenance flows and

temperature-lowering pulsing flows. In the lower river below Ennis Dam, survival and condition of the larger brown trout appear to have been affected by the lower, warmer summer flows of 2002.

Hebgen Reservoir

Hebgen's wild rainbow trout continued to decline over 2002. Normally, hatchery-raised fish make up about 2% of the reservoir's rainbow numbers, as measured in annual netting surveys. In 2001, hatchery fish comprised 15% of the net catch. In 2002, they comprised 17%. Reproductive success and the subsequent recruitment of young has declined over this drought cycle, the likely consequence of inadequate spawning flows in the reservoir's tributaries.

West Gallatin River

Trout are prospering in the non-dewatered stretch of the West Gallatin River within the Gallatin Canyon upstream from Gallatin Gateway. Here, the rainbow population is typically limited by the harsh winter environment and high spring flows. A series of mild winters and the absence of flood flows have benefited fish. The lower river reaches below Gallatin Gateway, which are severely dewatered for irrigation, have not been monitored by FWP in recent years.

Hyalite Reservoir

Adfluvial (lake-dwelling) grayling numbers are starting to improve but still are far less than desirable. Recent habitat improvements in the reservoir's spawning tributaries may be benefiting grayling. The reservoir's cutthroat fishery continues to prosper.

Yellowstone River

Yellowstone River flows were better in 2002 compared to 2001, but still less than normal. Despite drought, trout abundance was stable or increasing in all areas surveyed this spring. Increasing fish abundance in the Yellowstone River contrasts with trends of decreasing abundance in other drought-stricken rivers. However, this increase may simply reflect redistributions of fish. Even large tributaries of the Yellowstone River, such as the Shields River, showed significant reductions in fish abundance in early spring. Trout capture rates in some sections were two-thirds or less than usual in the smaller rivers and streams. Populations increased again in most of these areas with increasing flow in the spring.

Clark Canyon Reservoir

Normally 5000 surface acres, Clark Canyon Reservoir has shrunk to 1000 acres, a record low. Rainbow numbers have declined from 14 per net set in 1998 to eight per net set in 2002. Survival of FWP's young-of-the-year plants has plummeted from a high of 8.5 per net set in 1995 to 0.2 per net set in 2002. The crash of the fishery has discouraged angling, with angling pressure declining from about 53,000 angler days in 1997 to 25,000 in 2001. Absence of non-residents accounts for most of the decline.

Ruby Reservoir

Ruby Reservoir was drained to 3500 AF at the end of the 2002 irrigation season, which is well below the minimum fisheries target pool of 5500 AF and optimum of 10,000 AF. The rainbow fishery has suffered over the drought cycle. Catch per net set in 1999, 2000, 2001, and 2002 was 100, 50, 21, and 33, respectively. The yearling catch per net set fell from 20 in 1999 and 2000,

to three in 2001 and nine in 2002. Along with the declining numbers, the average size of the fish has substantially decreased.

Ruby River Below Ruby Reservoir

Overwinter flow releases at Ruby Dam were reduced to 30 cfs for fall/winter 2002-03. The river's brown trout—the dominant species—have been on the decline since 2000. Of note is the loss of the larger (≥ 18 inches) brown trout, which decreased from 195 per mile in 2000 to 50 per mile in 2002.

Ruby River Above Ruby Reservoir

Both the rainbow and brown trout fisheries have suffered during this drought cycle. Brown trout numbers fell from 800 per mile in 2000 to 430 per mile in 2001. Rainbow, too, have declined, from 230 per mile in 1998 to 150 per mile in 2000.

Beaverhead River

The nationally acclaimed trophy trout fishery of the Beaverhead River below Clark Canyon Dam has taken a major hit the past drought years. Last winter (2001-02), flow releases, which are normally in excess of 100 cfs, were reduced to 35 cfs; this winter (2002-03), to 27 cfs. Total biomass of brown trout plummeted from 3700 pounds per mile in 1999 to 2500 pounds per mile in 2002. Trophy trout numbers likewise declined. In 1999, the river held 275 trophy browns (≥ 20 inches) per mile. Now (2002), the number is 65 per mile. Reduced flow releases during the drought of the late 1980's led to a similar decline of trophy-size browns (see Figure 3). Accompanying the current reductions is a decline in trout condition. The normally plump trophy browns are now noticeably thinner, suggesting additional population losses can be expected in 2003.

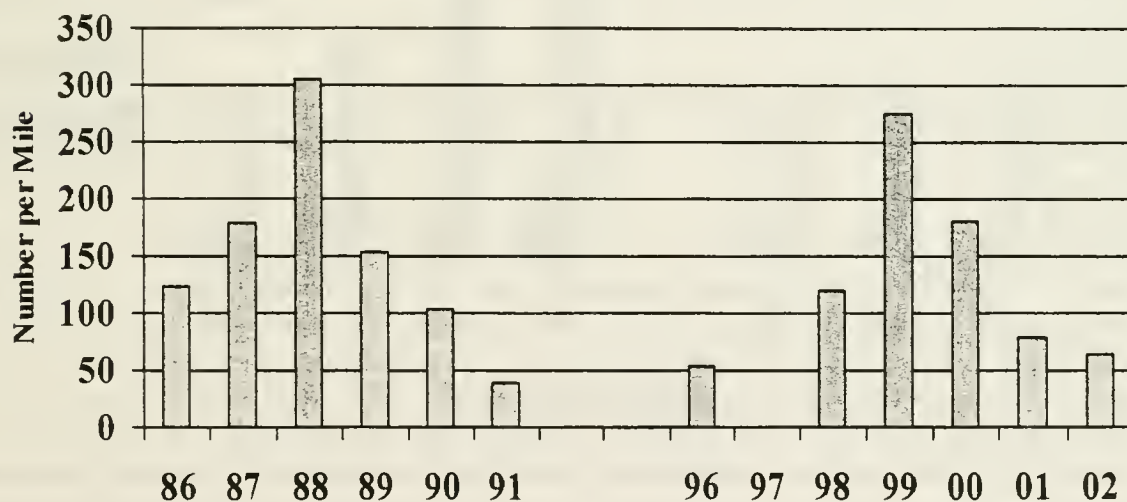


Figure 3. Density of 20-inch (Age V+) and larger brown trout in the Hildreth Study Section of the Beaverhead River; 1986-1991 and 1996-2002.

Big Hole River

The Big Hole's trout populations continue to fare better than they did during the drought of the late 1980's, which was equal in severity to the current drought. Better water management, a consequence of the basin's drought plan and the cooperation of water users, has prevented summer flows from dipping to the lows of the late 1980's (see Table 1).

Table 1. Big Hole River near Melrose: Critical Flow Summary

Drought Year	Number of Days average daily flow < 150 cfs	Lowest Average Daily Flow
1988	51	53
2000	17	126
2001	7	146
2002	0	197

Despite faring better during the current drought, trout populations throughout the river have generally declined since the start of this drought cycle. For example, the larger brown trout (16 inches and longer and 18 inches and longer) in FWP's Hogback study section have declined by 47% and 57%, respectively, since 1999 (see Figure 4). Prolonged drought will likely lead to further reductions.

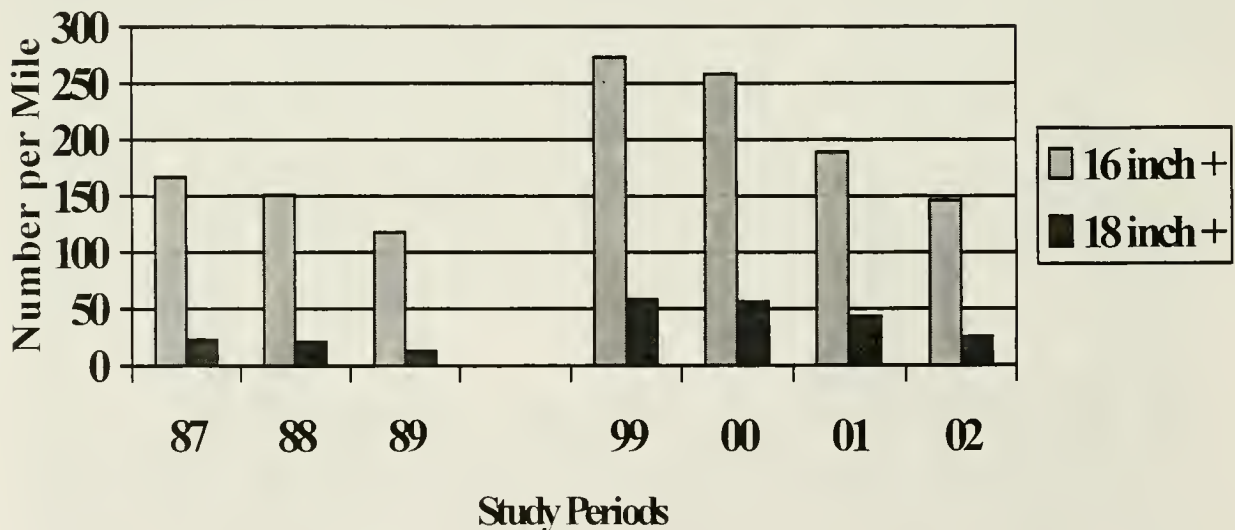


Figure 4. Density of 16-inch and 18-inch and larger brown trout in the Hog Back Study Section of the Big Hole River; 1987-1989 and 1999-2002.

Jefferson River

The brown trout fishery rebounded from a significant decline during the extremely low flows of 2000 and 2001. Population estimates during April 2002 indicate that fish numbers are on the rise in two of three long-term study sections (see Figure 5). Despite the improvement, trout numbers remain depressed throughout the river, the consequence of many habitat problems, chronic dewatering being foremost.

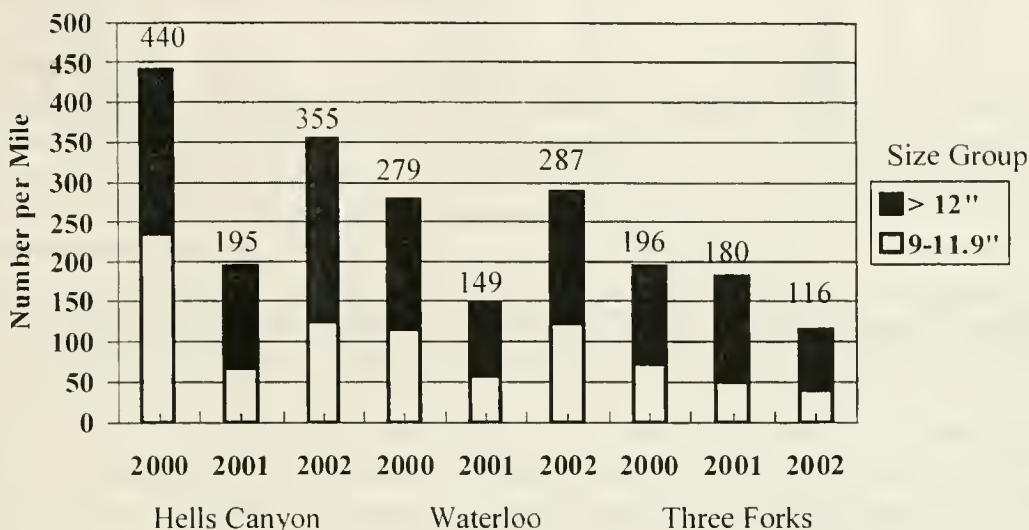


Figure 5. Jefferson River brown trout estimates, 2000-2002.

Region 4 (Great Falls)

Smith River

In 2002, rainbow trout numbers in the Smith River in FWP's electrofishing study sections were at or near record lows. Brown trout, on the other hand, were holding up at average to above-average numbers.

FWP's long-term rainbow trout population data for the Smith show a strong correlation with the magnitude of August/September flows—the two months having the lowest flows of the year and the highest water temperature (see Figure 6). When mean August/September flows fell below 80 cfs (as measured at the USGS gauge), survival of young rainbows was lowest, as manifested by fewer numbers of older (age 2 and 3) rainbows in later years. The highest survival of young occurred when August/September flows averaged more than 150 cfs, subsequently producing the highest numbers of older rainbows in later years. Intermediate survival occurred when means were 80-150 cfs.

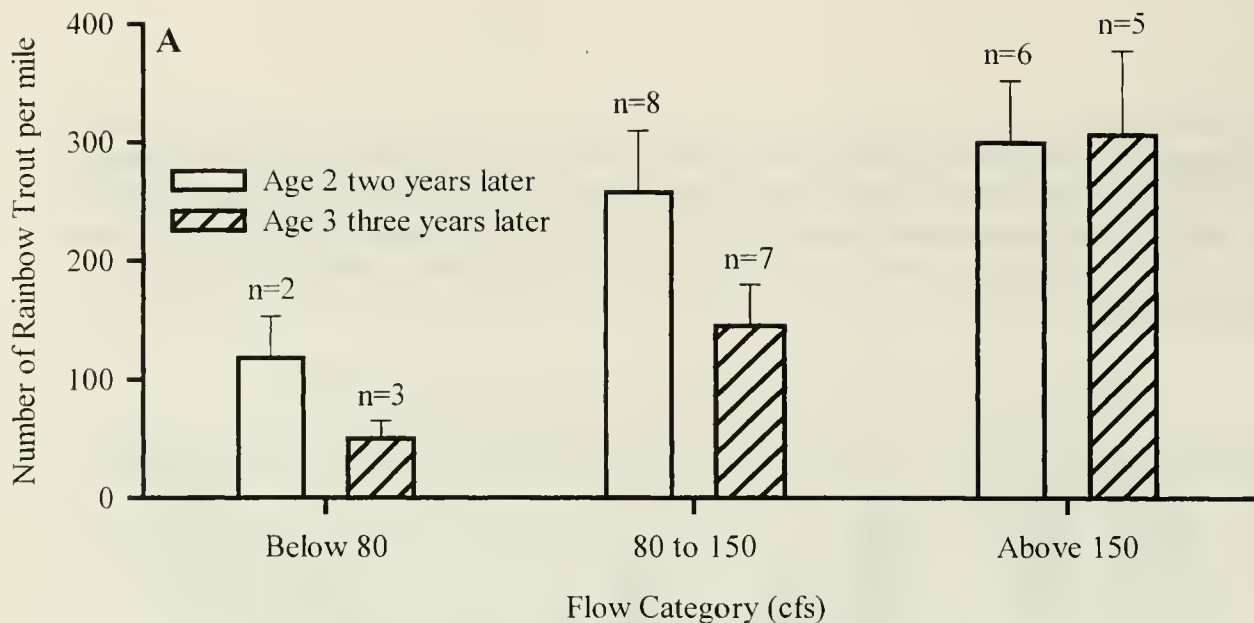


Figure 6. Number of age II and age III rainbow trout per mile produced by hatching year mean August and September flow, by category (i.e., <80 cfs, 80-150 cfs, 150+ cfs), Smith River

Big Spring Creek

2002 saw record to near-record low numbers of small rainbows in FWP's three study sections on Big Spring Creek. Numbers of larger rainbow trout (>10 inches) are holding their own. Overall, brown trout numbers have held up through this drought cycle.

Missouri River

Target fishery maintenance flows of 3000 cfs were generally met in the Missouri River below Holter Dam in 2002. Present trout population changes are more reflective of whirling disease, which has severely infected Little Prickly Pear Creek, the main spawning tributary for the upper river near Craig. Here, 767 yearling rainbow trout per mile were estimated in 2002, which is about half of the pre-whirling disease average (17 years) of 1560 yearlings per mile. Numbers of larger (>10 inches) rainbows, which remain above average at 3400 per mile, are in a slow but steady decline.

Rainbow trout in the lower river near Cascade rely on the Dearborn River and Sheep Creek for spawning, two tributaries only mildly infected with whirling disease. River yearling numbers were at record highs, while adult numbers (>10 inches) were slightly below average.

Throughout the river, whirling disease-resistant brown trout are faring well. Populations have increased to up to two times the riverwide average.

Lakes and Reservoirs

The west portion of Region 4 received generally good precipitation in 2002, filling many waters (Tiber, Bynam, Eureka, Pishkun, Willow Creek and Nilan reservoirs, and Lake Francis) that had been quite low for several years. One exception is Bean Lake, a natural pothole lake on the East Front. Low water continues and the lake's rainbow trout fishery is suffering. Windmills and a compressor will be used again this winter to aerate the lake and prevent winterkills.

Yellowwater and Petrolia reservoirs in north central Montana were also in bad shape entering the winter.

Region 5 (Billings)

Southcentral Montana remains locked within an extreme drought. The Bighorn and Musselshell river basins are considered “extremely dry” while the Clarks Fork, Stillwater, Boulder, and Yellowstone rivers are rated “moderately dry.”

Musselshell Basin

Springtime in the Musselshell Drainage began with Bair and Martinsdale, the upstream-most reservoirs, nearly dry, and Deadmans Basin Reservoir at 16% of capacity. Only a May storm provided enough fill to allow releases from Deadmans for one irrigation cycle on the highest priority fields. River flows ranged from meager near Harlowton to nil at Mosby throughout the spring, summer, and fall.

During May electrofishing sampling in the Musselshell River above Harlowton, no trout between eight and 13 inches were found. In 1997, brown trout longer than nine inches numbered 249 per mile; in 1999, 2001, and 2002, they numbered 216, 250, and 103 per mile, respectively. Some small (three- to six-inch) fish remain, but they may be eaten by the larger brown trout before they can grow and replace missing year classes.

Deadmans Basin, with a capacity of 72,000 AF, contained 9000 AF in late 2002. The remaining pool has a maximum depth of 20 feet, which should be adequate to avoid winterkill. Sucker populations are declining more rapidly than expected, likely because they are crowded into a smaller pool with fast-growing, opportunistic tiger muskies. The tigers are now turning to their secondary prey, small trout and kokanee. The average size of the remaining salmonids is increasing and their condition is excellent.

Bighorn Basin

As of October 25, 2002, flows in the Bighorn River had been continuously below 2000 cfs for 536 days (previous record was 179 days in 1995). On October 25, the flows dropped to 1300 cfs, 200 cfs below the previously established “absolute minimum” flow for fisheries. The most probable forecast is for flows to stay at 1300 cfs through March 2003.

At these flows, trout spawn only in the mainstem of the river. No side-channel or river-margin habitat is available for spawning or rearing the young fish. Instead, they are forced into the main channel to compete with and be preyed upon by larger brown and rainbow trout. In addition, cold water drawn exclusively from deep ports in Yellowtail Dam inhibits the growth of the fish and their invertebrate food base.

Consequently, trout populations have declined dramatically. Brown trout in the upper 13 miles have dropped from 8800 fish (>9 inches) per mile in spring 1998 to 800 per mile in spring 2002 (see Figure 7). Rainbow trout in this same section fell from 2300 fish per mile in spring 1997 to too few recaptures to run an estimate in 2002. Brown trout populations in the next 19 miles of the Bighorn declined from 2300 fish per mile in fall 1999 to a record low 400 per mile in fall

2002 (see Figure 8). The number of rainbow trout in this lower section actually increased slightly from the 2001 estimate to 600 fish per mile, but approximately 400 of those were age one fish. During the mid- to late-1990's, populations were around 1000 rainbows per mile, and many were larger fish.

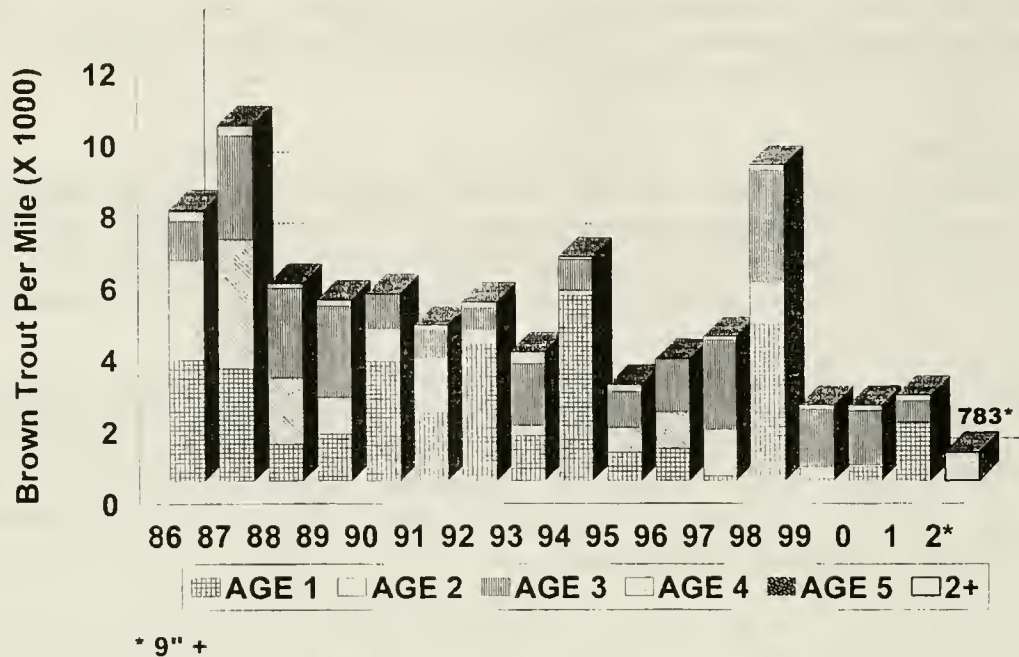


Figure 7. Brown trout age composition, Bighorn River, upper study section, 1986-2002.

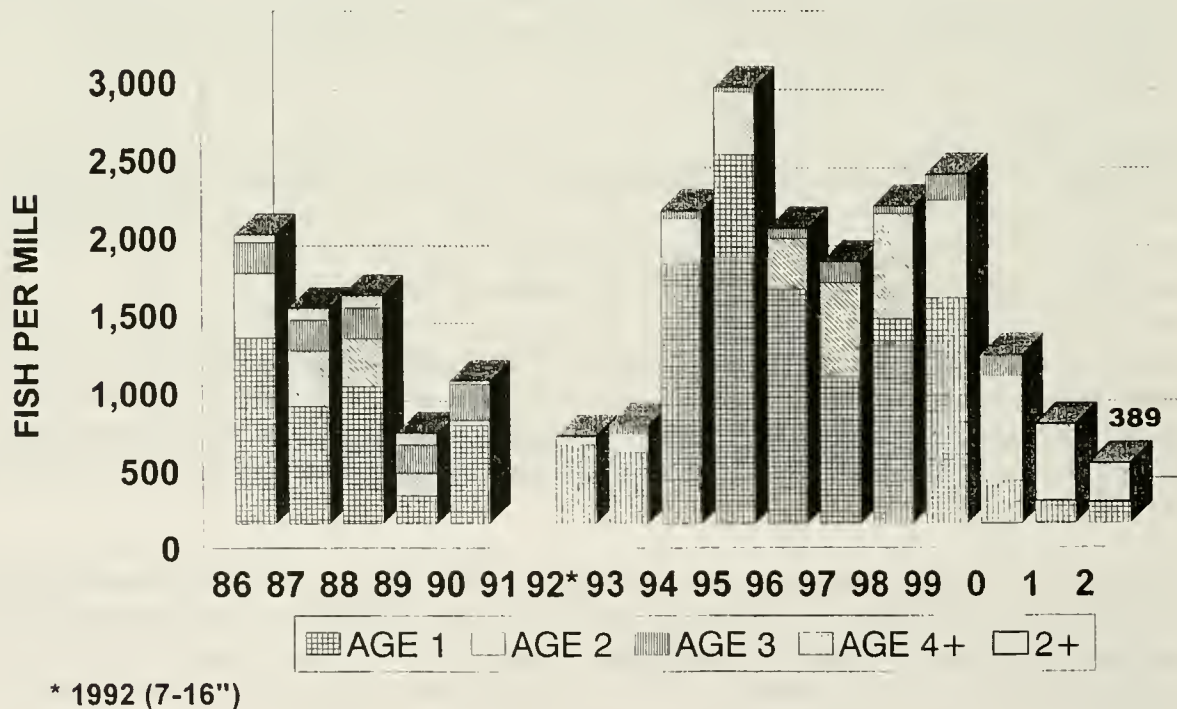


Figure 8. Brown trout age composition, Bighorn River (lower study section).

Bighorn Lake suffered from record low inflows through much of 2002. The boat ramp at Ok-a-Beh was open for ten days from June 28 to July 7, and Barry's Landing was open the 47 days from June 6 through July 22. The lake volume remains at about 61% of the conservation pool. Prospects for filling next year are slim, especially with upstream reservoirs at record low elevations. The National Park Service will extend the two ramps to allow some boat launching next year.

Other Waters

The mid-Yellowstone River and its major tributaries were generally flowing at half to three quarters of normal, which is better than last year. Flows in the Boulder, Stillwater, and Clarks Fork rivers (along with Rock Creek) had flows below long-term averages, but above levels where severe impacts to fisheries are expected. Flows in the Yellowstone were too low to allow normal fish sampling. One estimate for Rock Creek was comparable to past estimates. A brief spike in water temperatures during the third warmest July on record led to voluntary restrictions on angling (morning fishing only). The high country received some precipitation during late August and early September that helped sustain valley flows. Whether the high mountain lakes received enough water to prevent winterkills is unknown.

Region 6 (Glasgow)

Missouri River above Fort Peck Reservoir

The drought cycle continued for the fifth consecutive year in 2002 on the Missouri River above Ft. Peck. Native fish species, including paddlefish, sauger, and shovelnose sturgeon, endured very low flows early in the spring and high flows of short duration in late spring. Suitable trigger flows necessary to initiate an upstream spawning migration of paddlefish did not occur until June 13. As a result, minimal paddlefish production was documented with the observance of only a few young-of-the-year paddlefish in late summer.

River flows were low and static during the sauger spawning season, late April and early May, and probably will result in production of an insignificant year-class. Strength of this year-class will not be determined until these sauger mature into a catchable size.

Reservoirs

The northeast corner of the state again avoided severe drought in 2002, including the Glasgow area. Reservoirs in the extreme east, Box Elder and Medicine Lake, are faring well with regard to water levels and fish populations. However, reservoirs in the middle and western portions of Region 6 are suffering the consequences of long-term drought. Dry Fork Reservoir was totally dry in the beginning of 2002, but began to refill later in the year. Fresno Reservoir water level was at about 50% of full pool at the end of January 2003. The walleye fishery there is hanging on but in trouble. In 1998, FWP's netting surveys yielded 253 walleye per 12 net sets; in 2002, the net catch was reduced to 25 per 12 net sets. There's been no recruitment of young walleye into the population and the remaining fish are in fair to poor condition. Nelson Reservoir was very low early in the year, but considerable filling occurred in the fall. Its lone salvation was its dead storage, which adequately sustained the fishery.

As of January 2003, Beaver Creek Reservoir had refilled to within 10 feet of full. Depths up to 90 feet allow fish to survive in drought years. Bear Paw Lake, which FWP manages exclusively for fish, was at 70% of capacity but filled by the end of January 2003. Typically, water levels are held at 100% of its capacity year-round. Bailey Reservoir did not receive summer rains and is dropping to dangerous levels, though no winterkill has yet occurred. Bear Paw Lake, Beaver Creek Reservoir and Bailey Reservoir were the only viable reservoir fisheries in the Havre area in 2002.

Streams of the Bear Paw and Little Rocky Mountains

Many small, isolated streams in the western part of the region were almost completely dewatered in 2002. Many reservoirs are still dry or so low they cannot support fish. A few reservoirs fed by prairie runoff have surviving fish populations, but water levels are so low that a significant number are expected to winterkill.

Milk River

The entire reach of the Milk River from Fresno Reservoir upstream to the Canadian line was dewatered for most of the winter of 2001-02. Sauger from that reach sought refuge in what was left of Fresno Reservoir. Runoff from the headwaters of the Milk River drainage began to flow into Fresno Reservoir in late June. Fresno filled to full pool and was then drawn down during irrigation season. With good shoreline vegetation, the stage is set for good natural reproduction of yellow perch and northern pike. Currently, the reservoir is above 50% of active conservation pool, and further downstream, Nelson Reservoir, is 73% of active conservation pool. During the past summer, anglers found low-water boat launches on gravel bars. Nelson's fishery has fared much better than Fresno's.

Fort Peck Reservoir

Declining water levels continue to negatively impact fish species that spawn along the shoreline in submerged vegetation. Without a rising or stable pool during the spring, yellow perch, northern pike and forage minnows (e.g., emerald shiners and spottail shiners) cannot successfully spawn. As waters receded during the 2002 summer months, young-of-the-year that survived were unable to find suitable rearing habitat or cover to shelter them from predators.

Lake trout were also negatively affected by the continued drawdown. During the fall these fish concentrate on the rock riprap on the dam face to spawn. When the lake elevation hits 2,225 feet, 60% of the available spawning habitat at normal pool is lost. The lake elevation is now 2,213 feet, shrinking available spawning habitat even further. During the winter, incubating eggs may be trapped in ice or left high and dry as water levels drop.

Reproduction of reservoir fishes that migrate upstream to the Missouri River and its tributaries to spawn is typically unsuccessful in low flow years. Gill netting, however, indicated that small numbers of young-of-year sauger were produced. A few paddlefish young-of-the-year were also observed, probably due to a short lived spike in flows during June. This is the 4th consecutive year of minimal to no successful propagation of paddlefish.

At this time, low reservoir levels have not negatively affected walleye abundance, whose numbers are sustained by annual plants of fry and fingerling. It is anticipated, however, that

unrelenting water declines will reduce the abundance of forage fish on which small walleye depend for food. Stocked walleye are also more likely to succumb to predators with absence of shoreline vegetation. Walleye egg-taking also becomes more threatened as the reservoir drops due to difficulty in determining where ripe fish are concentrated and then accessing and trapping them.

The last strong year-class of cisco, a major forage fish, was produced in spring 2001. This year's year-class was weak, and prospect for good production in spring 2003 is not likely as incubating eggs along the shoreline this winter will be dewatered.

Region 7 (Miles City)

Continued drought through 2002 has increased impacts to the regional fisheries. Dry conditions continued for the majority of the year with sporadic rains providing limited relief in localized areas within the region.

Yellowstone River

Flows on the Yellowstone River (YSR) during 2002 were similar to those in 2001. Peak flows did not reach 15,000 cfs (at the Miles City gauge), which is less than half the annual mean peak flow. Limited fall sampling of fish populations in the YSR did not show impacts that could be decisively correlated with drought trends, but capture rates and species distribution have continued to decline through this drought cycle.

One obvious impact to YSR fish populations was observed at the Intake Diversion during the annual six-week paddlefish season. Paddlefish harvest was again minimal with 715 fish taken. This represents less than 75% of the 10-year average number taken, and less than half of the Montana target annual harvest rate of 1500 fish. Paddlefish spawning migrations up the YSR are triggered by high flow events. With limited snowmelt runoff, paddlefish runs were minimal, indicating that the 2002 spawning effort was marginal. Recruitment data from the North Dakota Game and Fish Department confirm the impact of this long-term drought on the paddlefish population. Spawning and juvenile recruitment remain low, mirroring the flow regime of the YSR system. Continued drought and an associated reduction in paddlefish recruitment will necessitate increased harvest restrictions on this population. The interstate management of this population was altered this year to reduce the two-state harvest from 3000 to 2000 adult fish.

Tongue River

The Tongue River (TR), an important spawning tributary to the Yellowstone River, also suffered from continued drought. Irrigation demands on the TR essentially dried up the lower 20 miles of the river throughout the irrigation season (May-October). The T&Y Diversion took the entire stream flow into the canal system, although some irrigation return flow accumulated further downstream; the end result was a desiccated lower river. The loss of connectivity with the YSR during the entire irrigation season eliminated spawning and nursery opportunities for multiple species of fish. In favorable flow conditions, the TR system is heavily utilized for spawning by sauger, shovelnose sturgeon, catfish, and 20+ other native species. The loss of this habitat and resultant spawning and recruitment opportunities will result in depleted populations in both the TR and YSR systems.

The TR above the T&Y, upstream to the TR dam, fared well during the 2002 season, a consequence of irrigation water delivery. Water, which remained in this reach of the river during the entire year in order to facilitate crop production, also allowed for relatively stable and healthy conditions for fish populations.

Tongue River Reservoir

The fisheries of the Tongue River Reservoir were also impacted due to the prolonged drought, but fared better in 2002 than in 2001. Reservoir elevations, although reduced, did not drop as rapidly as they did during the 2001 season. The maintenance of relatively stable reservoir levels resulted in marginal to fair spawning success by the black and white crappie populations. A strong year class of three- to four-year-old crappie is currently the backbone of this popular fishery. If this drought continues into 2003, with resulting draw-down of the reservoir, crappie spawning and recruitment could be impacted.

Powder River

The Powder River is another major spawning tributary to the Yellowstone River. The same species that utilize the TR also spawn and reside in the Powder. This system also lost connectivity to the Yellowstone River during August of 2002, the third year in a row that it was inaccessible to fish due to drought. Spring flows were adequate to trigger spawning runs of sauger, catfish and shovelnose sturgeon. It is questionable if these spawning efforts produced young recruits for the Yellowstone River because drought combined with irrigation depletions eliminated flows to the YSR later in the summer.

Other Yellowstone Tributaries

Many of the smaller tributary systems along the YSR have been underutilized by spawning fish during this prolonged drought. These systems, most of which flow for two to six months per year, provide spawning and nursery habitats for many species of fish in the YSR. Many of the cyprinid minnows found in the YSR are spawned in the small, ephemeral streams. Reduced and absent flows have limited spawning use. Long-term impacts to the YSR ecosystem will be evident in future years as the abundance of these forage species declines.

Prairie Ponds

Approximately 100 prairie ponds are managed for localized fishing opportunities in Region 7. During the course of this drought, many of these ponds have dried up or become so shallow that they cannot support fish. The incidence of both summer and winterkill has increased. Of the 100 ponds in the management program, only 20 remained viable fisheries in fall, 2002. Without snowmelt or rains, these remaining ponds could be lost as well. Once the drought cycle ends and these ponds are rewatered, fisheries will be re-established via stocking. However, it could take from one to two years to grow stocked fingerlings to catchable size.

Statewide Grayling Reintroductions (multiple regions)

Upper Big Hole River

Despite marginally better flows in 2002 (flows in the upper Big Hole River fell below 20 cfs for only a few days), the future of the native fluvial (or river-dwelling) grayling population remains

bleak. Population estimates in two long-term grayling study sections (see Figure 9) were unobtainable in 2002 due to their low numbers. On the positive side, grayling numbers in a key Big Hole tributary remain decent.

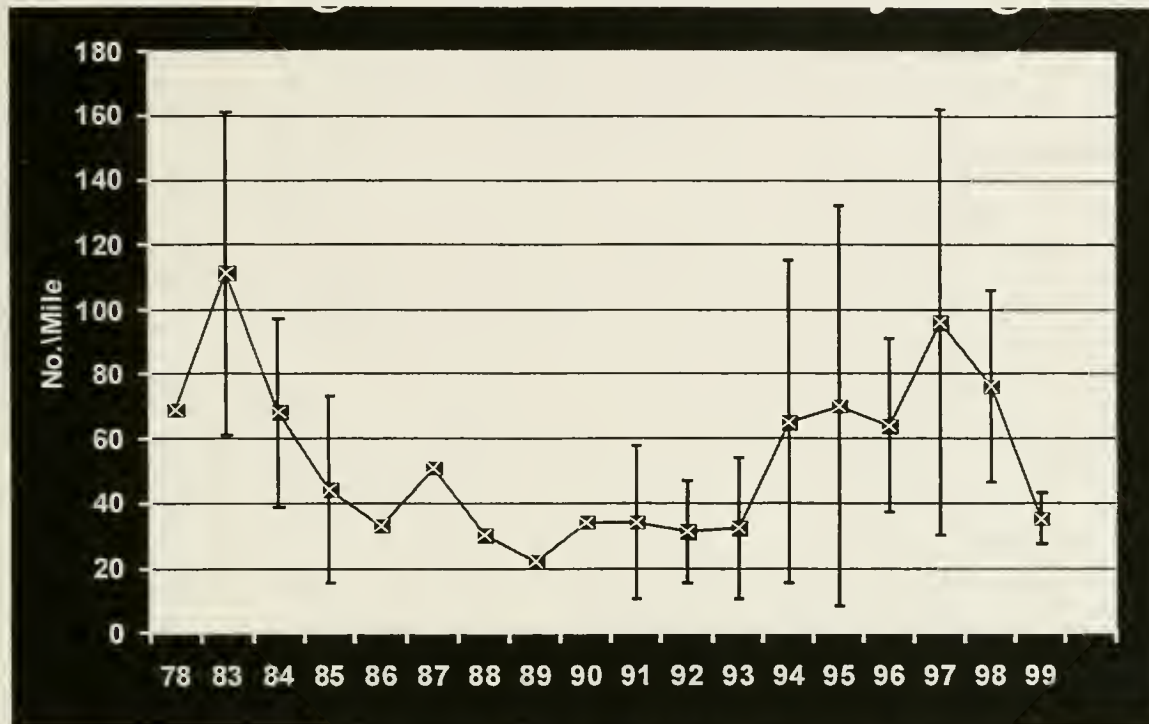


Figure 9. Big Hole arctic grayling population trends, 1978-1999 (2000, 2001 flows too low to sample).

Upper Ruby River

Another tough water year has hindered grayling reintroduction efforts in the upper Ruby River above Ruby Reservoir. Densities of planted grayling remain low, and few fish are being naturally produced. It's questionable whether there are enough remaining fish to sustain a wild, reproducing population. On the up side, planted grayling are staying in the river and not moving downstream into Ruby Reservoir.

Sun River Tributaries

Most grayling stocked in the South Fork Sun River have moved downstream into Gibson Reservoir. The South Fork will likely be dropped from the reintroduction program. The North Fork faces the same out-migration problem, although some grayling are staying in the river. The future of grayling reintroduction in the North Fork is undecided at present.

Missouri Headwaters

Ongoing drought and accompanying warm summer water temperatures have hampered grayling reintroduction in the Missouri Headwaters and lower Beaverhead River. Reintroduction is still being pursued.

